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TECHNICAL CORRIGENDUM 1

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Information technology — Coding of audio-visual objects —

Part 20: Lightweight Application Scene Representation (LASeR) and Simple Aggregation Format (SAF)

TECHNICAL CORRIGENDUM 1

Technologies de l'information — Codage des objets audiovisuels —

Partie 20: Représentation de scène d'application allégée (LASeR) et format d'agrégation simple (SAF)

RECTIFICATIF TECHNIQUE 1

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In subclause 6.2.2 “Fonts”, replace the first paragraph with:

LASeR supports the encoding of fonts. Fonts may be encoded separately from the scene using ISO/IEC 14496-18, and sent as a media stream together with the scene stream. Fonts may also be transmitted using SVG elements related to font encoded using the `privateAnyXMLElement` SDL construct, as specified in 12.2.1 and 12.2.3.

In subclause 6.3 "Timing Model", replace the first paragraph with the following:

This subclause describes the notion of Scene Times, Media Times, and Encoded Scene Times.

In subclause 6.3, replace the following paragraph:

Scene times within that access unit ("begin" in this example) are encoded for transmission relative to the scenetime of the access unit. In this example, the "begin" time X is transmitted as the Encoded Scene Time X-ST(r). For LASeR commands inside a script element, ST(r) is the scene time when the script is activated.

with:

For LASeR commands inside a conditional element, ST(r) is the scene time when the conditional is activated.

In the last paragraph of subclause 6.3, replace sentence:

The number of ticks per seconds for time values relating to the scene time line is defined by the timeResolution attribute of the LASeRHeader.

with:

The number of ticks per seconds and origin of time values relating to the scene time line are defined by the timeResolution and timeEncoding attributes of the LASeRHeader.

In the last paragraph of subclause 6.3, remove sentence:

Attributes “begin” and “end” are encoded as offset from the scene time of the current access unit.

In subclause 6.5 "Supported Events", replace in Table 1:

“pause”	urn:mpeg:mpeg4:laser:2005	Freezes the clock of the timed object they are sent to, and have no effect on non timed objects.	No	No
“resume”	urn:mpeg:mpeg4:laser:2005	Restarts the clock of the timed object they are sent to, and have no effect on non timed objects.	No	No

with:

“pause”	urn:mpeg:mpeg4:laser:2005	Freezes the clock of the target timed element, and have no effect on non timed elements.	No	No
“play”	urn:mpeg:mpeg4:laser:2005	If the target timed element is not active, receiving this event starts the timed element as if it received an activate event. If the timed element has been paused, receiving this event resumes the clock of the timed element. It have no effect on non timed elements.	No	No

In subclause 6.5, add to Table 1:

“executionTime”	urn:mpeg:mpeg4:laser:2005	This pseudo event can only appear in time expressions in Replace Attribute and Insert Indexed Attribute commands; upon the execution of the command, it is replaced by the current time.	No	No

In subclause 6.5, remove Table 2 and the associated introductory sentence.

In subclause 6.6.2.1 "LASeR headers semantics", replace the following:

LASeR defines a way to partition scenes into incremental scene segments, allowing services to be built of different scene segments, the first scene segment containing a NewScene update, the other scene segments having the ***append*** bit set and not starting with a ***NewScene*** update, and being designed as addition to the first scene segment.

LASeR defines an interface to persistent storage. The LASeR engine shall cache permanent streams and selected scene information on a best effort basis. The principles behind this caching closely follow the state caching mechanism in HTTP, commonly called cookies [RFC 2965]. Within the LASeR streams, there are two commands that may be used. One command saves, associated with a string name called ***groupID***, the values of some attributes of some nodes. This storage is scoped by the domain-name and path computed from the source using the fields in the LASeR header. The other command restores the attributes (if any) previously saved under the given ***groupID***, as scoped by the domain-name and path.

The stored values and permanent streams are scoped by the domain-name and path. That is, it is possible for both ".acme.com" and ".widget.com" to store data under the same ***groupID*** and for that storage to be distinct; similarly for "/user/laser-expert/" and "/user/laser-novice/" at ".acme.com" to save state under the same ***groupID***, and for those saved states to be distinct.

with:

LASeR defines a way to partition scenes into incremental scene segments, allowing services to be built of different scene segments, the first scene segment containing a NewScene update, having the ***newSceneIndicator*** bit set, and the other scene segments not starting with a ***NewScene*** update, and being designed as addition to the first scene segment.

LASeR defines an interface to persistent storage. The LASeR engine has the ability to cache selected scene information, using specific LASeR commands, on a best effort basis. The principles behind this caching closely follow the state caching mechanism in HTTP, commonly called cookies [RFC 2695]. Within the LASeR streams, there are two commands that may be used. One command saves, associated with a string name called ***groupID***, the values of some attributes of some nodes. This storage is scoped by the domain-name and path computed from the source using the fields in the LASeR header. The other command restores the attributes (if any) previously saved under the given ***groupID***, as scoped by the domain-name and path.

The stored values are scoped by the domain-name and path. That is, it is possible for both ".acme.com" and ".widget.com" to store data under the same ***groupID*** and for that storage to be distinct; similarly for "/user/laser-expert/" and "/user/laser-novice/" at ".acme.com" to save state under the same ***groupID***, and for those saved states to be distinct.

In subclause 6.6.2.2 "Attributes of LASeR Header", do the following edits:

- Remove Table 3

- Remove the bullet defining "append"

- Remove the bullet defining "hasStringIDs"

- Add the following 2 bullets:

- ***newSceneIndicator***: this Boolean indicates if this scene segment starts with a NewScene command or a RefreshScene command. When it is set, the first LASeR command in this scene segment shall be a NewScene or a RefreshScene; otherwise, the first LASeR command in this scene segment shall be neither a NewScene nor a RefreshScene.

NOTE : the terminal may remove (parts of) the existing scene tree, for resource optimization, when it receives a LASeRHeader with this Boolean set to true.

- *timeEncoding*: this attribute defines the reference for encoded times: if the value is 0, all times in this segment are relative to the scene time line; if the value is 1, all times in this segment are relative to the beginning of this segment; if the value is 2, all times are encoded in the same way as in the previous segment.

In subclause 6.6.2.4 "Encoding Context", add the following sentence:

Binary IDs shall not be referred to across scene segments.

Create subclause 6.6.3 "String IDs Encoding":

6.6.3 String IDs Encoding

The element StringIDTable is an optional first child of the LASeRUnit in LASeRML. This StringID table informs the encoder to encode the given IDs as a string ID. When hasStringIDs is set, this table can be omitted as all IDs shall be encoded as strings.

```
<StringIDTable strings="<oneString> <oneString> …"/>
```

An ID that must be encoded as a string ID must be declared at the latest in the StringIDTable of the LASeRUnit where it is first used (by definition or by reference). When a LASeR AccessUnit is a random access point (RAP), it shall contain a table containing all already known string IDs.

In subclause 6.7.1 "LASeR Scene Commands Overview", replace the second bullet of the second paragraph with the following:

The following attributes cannot be updated: attributeName, id, type, xml:space, preserveAspectRatio, the x and y attributes of the text element and the following attributes of the animation elements: by, from, to, values and fill. This constraint can be worked around by updating the whole element.

Append the following at the end of subclause 6.7.1:

LASeR Commands modify a scene tree regardless of their representation, transport or encoding and regardless of the origin of the scene tree on which they apply. Commands and initial scene may be represented separately in different documents, encoded and delivered in different streams.

In subclause 6.7.2.1 "Add attributes semantics", add the following paragraph at the end of the subclause:

The value designated by ***operandElementId*** and ***operandAttributeName*** is the presentation value. The following attributes cannot be added to: ***children***, ***d***, ***mpath***, ***begin***, ***end***.

In subclause 6.7.4.2 "Delete Attributes", replace:

- ***attributeName***: this attribute defines the name of the attribute in which the deletion happens, by default "children". This attribute is only allowed in conjunction with index.

with:

- ***attributeName***: when index is specified, this attribute defines the name of the attribute in which the deletion happens, by default "children". When index is not specified, the whole attribute is removed.

In subclause 6.7.5.1 "Insert Semantics", replace:

The ***Insert*** command inserts an element in a parent list.
with:

The ***Insert*** command inserts an element or value in a list.
In the examples, replace "Insert href" with "Insert ref" three times.

In subclause 6.7.5.2 "Insert attributes", add the following sentence at the end of the second bullet:

In the case of indexed inserts to the begin/end attributes of all timed elements, the index is ignored, which means the insertion will be done at the end of the list. Indexed inserts to the attributes of type path, namely d and mpath, are not allowed.

In subclause 6.7.8.1 "Replace Semantics", replace the third paragraph with the following:

The ***Attribute Replacement*** command replaces a specific attribute of an element with a new value. The ***ref*** attribute specifies the parent element, the ***attributeName*** attribute specifies which attribute of the parent

element is replaced, and the ***value*** attribute or the content of the Replace element specifies the new value. If ***index*** is specified, then the replacement is done on the value with rank ***index*** in the list.

When replacing begin and end attributes, the pseudo-event executionTime can be used to signify the time at which the command is executed. After execution, this pseudo-event is replaced by its time value.

Insert the following two paragraphs at the end of subclause 6.7.8.1:

The following restrictions apply:

- attributeName may point at a private XML attribute, in which case index is not allowed.
- Indexed replacements to the begin/end attributes of all timed elements are not allowed.
- Indexed replacements to the attributes of type path, namely d and mpath, are not allowed.
- The values ***id***, ***begin***, ***end***, ***d*** and ***mpath*** are not allowed for operandAttributeName.

The value designated by ***operandElementId*** and ***operandAttributeName*** is the presentation value as defined in the SVG specification.

Attribute replacement with attributeName=”textContent” and a value of index replaces the index-th component of the text content of the target element, if it exists. Without an index value, the text content is flattened and replaced as a whole, as in text editing. In the absence of text content, this command is ignored.

In subclause 6.7.8.2 "Replace Attributes", replace the semantics of the attributeName attribute with the following:

- ***attributeName***: this attribute defines the name of the replaced attribute. Acceptable values are the name of any attribute of a LASeR element or the name of any private XML attribute used in the scene.

In subclause 6.7.10.2 "Save Command Attributes", in the semantics of the attribute field, add the following sentence.

The following attributes are not allowed in the ***attributes*** list: ***children***, ***begin***, ***end***.

In subclause 6.7.11.2 “SendEvent Command Attributes”, add at the end:

The above attributes carry information from the interface of the events, as specified in the next table:

Name of event	Attribute of event	Attribute of SendEvent
TimeEvent	detail	intvalue
UIEvent	detail	intvalue
WheelEvent	wheelDelta	intvalue
MouseEvent	screenX	*not carried*
	screenY	*not carried*
	clientX	pointvalue
	clientY	pointvalue
	button	intvalue
TextEvent	data	stringvalue
KeyEvent	keyIdentifier	stringvalue when unknown keyIdentifier, intvalue when a LASeR key code is defined
ProgressEvent	lengthComputable	*not carried*
	loaded	intvalue
	total	*not carried*

In subclause 6.8.1 “Conventions”, remove duplicated sentence:

The list of possible attributes for an element is given in the summary table in subclause 6.8.41
and fix reference.

In subclause 6.8.3 SVG a, add paragraphs at the end:

The expression “linked content” is used in the definition of the target attribute in [W3C SVG11]. For LASeR content, if the incoming data starts with a NewScene, “linked content” is the scene described by the incoming data; if the incoming data starts with any other command than a NewScene or RefreshScene, “linked content” is the current scene modified by the commands contained in the incoming data.

When an a element is activated, the incoming data replaces the previously incoming LASeR Commands and media.

In subclause 6.8.4.2 "SVG animate Attributes", in the semantics of the enabled attribute, add the following sentence:

The default value for this attribute is ‘true’.

In subclause 6.8.5.2 "SVG animateColor Attributes", in the semantics of the enabled attribute, add the following sentence:

The default value for this attribute is ‘true’.

In subclause 6.8.6.2 "SVG animateMotion Attributes", in the semantics of the enabled attribute, add the following sentence:

The default value for this attribute is ‘true’.

In subclause 6.8.7.2 "SVG animateTransform Attributes", in the semantics of the enabled attribute, add the following sentence:

The default value for this attribute is ‘true’.

In subclause 6.8.8.2 “SVG audio Attributes”, add this sentence to bullet about clipBegin:

The value of clipBegin is taken into account when the media element is activated.

Add this sentence to bullet about clipEnd:

The value of clipEnd is taken into account when the media element is activated.

Insert a new subclause between 6.8.9 and 6.8.10:

6.8.10 LASeR conditional

6.8.10.1 Semantics

The ***LASeR conditional*** element allows sets of scene commands to be inserted in the scene, for later execution upon activation by time or through the ***XML Events listener*** element.

6.8.10.2 Attributes

- begin: this attribute specifies the time at which the conditional element is triggered. This attribute is not animatable and not inheritable. The default value is indefinite.
- enabled: this Boolean attribute specifies whether the element is activatable or not. This attribute is not animatable and not inheritable. The default value is true.

Replace subclause 6.8.10 "SVG Cursor" with the following:

6.8.11 LASeR cursorManager

6.8.11.1 Semantics

The LASeR cursorManager element may point to any LASeR element to confer it the semantics of virtual pointer. The virtual pointer may be moved through LASeR Commands or other interaction by moving the object associated with the virtual pointer. When moved in and out of mouse-sensitive elements, the same events shall be generated as if a pointing device such as a mouse had been moved in its stead. For example:

- when the virtual pointer is moved in a mouse-sensitive region, a mouseover is generated,
- when the virtual pointer is moved out of a mouse-sensitive region, a mouseout is generated,
- when the virtual pointer is moved, a mousemove is generated,
- when the virtual pointer is located on a mouse-sensitive region and a activate event is received by the virtual pointer, the activate event is translated to a click event sent to the region.

LASeR elements implementing the interaction moving the object associated with the virtual pointer shall be placed as children of the cursor element.

Example:

```
<lsr:cursorManager id="cursorManager1" xlink:href="#vp">
  <!-- pointer movement -->
  <ev:listener event="accessKey(UP)" handler="#s1"/>
  <lsr:conditional id="s1">
    <lsr:Add ref="g" attribute="translation" pointvalue="0 -5"/>
  </lsr:conditional>
  <ev:listener event="accessKey(DOWN)" handler="#s2"/>
  <lsr:conditional id="s2">
    <lsr:Add ref="g" attribute="translation" pointvalue="0 5"/>
  </lsr:conditional>
  <ev:listener event="accessKey(LEFT)" handler="#s3"/>
  <lsr:conditional id="s3">
    <lsr:Add ref="g" attribute="translation" pointvalue="-5 0"/>
  </lsr:conditional>
  <ev:listener event="accessKey(RIGHT)" handler="#s4"/>
  <lsr:conditional id="s4">
    <lsr:Add ref="g" attribute="translation" pointvalue="5 0"/>
  </lsr:conditional>
</lsr:cursorManager>
<!-- activate event to be translated to a click -->
<ev:listener event="accessKey(FIRE)" handler="#cursorManager1"/>
<!-- mouse sensitive shape -->
<polygon ...>
   <ev:listener event="click" handler="#someConditional"/>
</polygon>
<g id="vp" fill="black">
  <!-- crosshair -->
  <line x1="-5" y1="0" x2="5" y2="0"/>
  <line x1="0" y1="-5" x2="0" y2="5"/>
</g>
```

6.8.11.2 Attributes

Attributes of lsr:cursorManager are x, y and xlink:href as defined on the cursor element of SVG 1.1 [W3C SVG11]

Replace subclause 6.8.15 "SVG g element" with the following:

The ***SVG g*** element is described in subclause 5.2 of [W3C SVG11].

And create the following subclauses:

6.8.28 LASeR rectClip

6.8.28.1 Semantics

The **LASeR rectClip** element acts as a clipping element, limiting the rendering of its children to a device-pixel-aligned rectangle, in addition to the semantics of the **SVG g** element. The rectangle is not sensitive to rotation or skew of the local coordinate system, and if scaled, its size is rounded to the nearest pixel. If the rectClip element carries a transform attribute, the corresponding transformation is applied to the rectClip children but not to the clipping rectangle itself.

6.8.28.2 Attributes

- **size:** a pair of coordinates defining the width and height of the clipping rectangle. All children are clipped by this axis-aligned rectangle centered on the origin of the local coordinate system and of size (size.x, size.y). This attribute is animatable but not inheritable.

6.8.30 LASeR selector

6.8.30.1 Semantics

The **LASeR selector** element acts as a selection element, rendering zero or one of its children, in addition to the semantics of the **SVG g** element.

6.8.30.2 Attributes

- **choice:** the rendering mode selector. It is either one of the value ‘none’ or ‘all’ or an integer representing the 0-based index of the child to be displayed. This attribute is animatable but not inheritable.

6.8.32 LASeR simpleLayout

6.8.32.1 Semantics

The **LASeR simpleLayout** element acts as a simple layout tool, by spacing its children by a specified amount, thus creating rows or columns of children, in addition to the semantics of the **SVG g** element.

6.8.32.2 Attributes

- **delta:** a pair of coordinates defining the spacing between children. The first child is displayed at (0,0) of the local coordinate system, and the n-th child is displayed at ((n-1)*size.x,(n-1)*size.y) of the local coordinate system. One of the two coordinates shall be 0. This creates a row or column of objects.This attribute is animatable but not inheritable.

NOTE If a child is hidden, the effect will be that a gap is visible between the previous and following child.

In subclause 6.8.19.2 "XML Events listener Attributes", do the following edits:

- in the semantics of the enabled attribute, add the following sentence.

The default value for this attribute is ‘true’.

- remove the semantics of timeAttribute and delay.

- replace the semantics of the handler attribute with the following:

- **handler**: as specified in XML Events Specification with the restrictions that supported handlers depend on the event. If the handler attribute is not present, the default handler is the parent of the listener element.

The following table summarizes LASeR specific handlers and their associated default action:

Event	Handler	Default Action
activate	a	follow the hyperlink
activate	conditional	executes the conditional content
pause	any element with timing attributes	freezes the time line of this element
play	any element with timing attributes	starts or resumes the time line of this element

The following table summarizes SVG specific handlers and their associated default action, as defined in the SVG specification:

Event	Handler	Default Action
activate	any editable element	starts the editing
activate	any element with timing attributes	activates the element

For other couple (event, handler) not defined in this specification, the default action is undefined.

Replace subclause 6.8.27 "SVG script" with the following:

The ***SVG script*** element is specified in subclause 18.2 of [W3C SVG11].

Replace subclause 6.8.32 "SVG text" with the following:

6.8.36 SVG text

6.8.36.1 Semantics

The ***SVG text*** element is defined in subclause 10.4 of [W3C SVG11], with the ***SVG text-decoration*** attribute from subclause 10.12 of [W3C SVG11].

6.8.36.2 Attributes

- Additional values for the text-decoration attributes are defined, taken from [4]: “LASeR_OUTLINE”, “LASeR_EMBOSS”, “LASeR_ENGRAVE”, “LASeR_LEFTDROPSHADOW”, “LASeR_RIGHTDROPSHADOW”.

NOTE Authors who want their content to degrade gracefully on pure SVG client should make sure that either: the default value for text-decoration is appropriate or that the requiredExtensions attribute is used.

- SVG font-size: the size of the font represents the height value of the EM-box of a font in the local coordinate system.
- SVG editable: If set to "false" (default) the contents of the text element are not editable in place through the browser. If set to "true", the browser must provide a way for the user to edit the content of the text element and all contained subelements which are not hidden (with visibility="hidden") or disabled (through the switch element or display="none").
- SVG display-align: this attribute is defined in subclause 10.11.5 of [2], i.e. it governs alignment in the direction orthogonal to the main direction of the text.

In subclause 6.8.36.2 "SMIL video Attributes", add this sentence to bullet about clipBegin:

The value of clipBegin is taken into account when the media element is activated.

In subclause 6.8.36.2, add this sentence to bullet about clipEnd:

The value of clipEnd is taken into account when the media element is activated.

In subclause 6.8.36.2, replace the paragraph concerning the semantic of the overlay attribute with the following:

lsr:fullscreen: This attribute can take the values true and false (the default). When set, the video shall be rendered alone and should fill the full screen area. This means no other visual element in the scene shall be rendered and in every other respect, the processing is as normal, e.g. events must still be dispatched to the appropriate elements and audio elements are rendered. The preserveAspectRatio attribute should be respected. If the preserveAspectRatio attribute indicates uniform scaling, then uniform scaling shall be applied. The viewport-fill-opacity attribute should be ignored. The fullscreen attribute is not animatable and not inheritable. This attribute shall not be set on more than one video element at any time in a scene.

Note: The full screen area is the largest part of the whole screen that can be used. The presence of this attribute indicates that the content author wishes to have the video presented as large as possible, and with as few as possible other visual elements (e.g. from other applications or from the OS) on the screen. If the video does not fill the rendering area, the viewport fill color is suggested but not required for the unpainted areas.

In subclause 6.8.37 "Summary of possible attributes per element", change title of this subclause from "Summary of possible children and attributes per element" to "Summary of possible attributes per element" and renumber to 6.8.41

Replace Table 7 with:

Element name	Attributes
a	audio-level color color-rendering display display-align externalResourcesRequired fill fill-opacity fill-rule nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable font-family font-size font-style font-variant font-weight image-rendering line-increment lsr:rotation lsr:scale lsr:translation pointer-events requiredExtensions requiredFeatures requiredFormats shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width systemLanguage target text-anchor text-rendering transform vector-effect viewport-fill viewport-fill-opacity visibility xlink:actuate xlink:arcrole xlink:href xlink:role xlink:show xlink:title xlink:type
animate	accumulate additive attributeName begin by calcMode class dur enabled end fill from id keySplines keyTimes max min repeatCount repeatDur restart to values xlink:actuate xlink:arcrole xlink:href xlink:role xlink:show xlink:title xlink:type xml:base xml:lang xml:space
animateColor	accumulate additive attributeName begin by calcMode class dur enabled end fill from id keySplines keyTimes max min repeatCount repeatDur restart to values xlink:actuate xlink:arcrole xlink:href xlink:role xlink:show xlink:title xlink:type xml:base xml:lang xml:space
animateMotion	accumulate additive attributeName begin by calcMode class dur enabled end fill from id keyPoints keySplines keyTimes max min path repeatCount repeatDur restart rotate to values xlink:actuate xlink:arcrole xlink:href xlink:role xlink:show xlink:title xlink:type xml:base xml:lang xml:space
animateTransform	accumulate additive attributeName begin by calcMode class dur enabled end fill from id keySplines keyTimes max min repeatCount repeatDur restart to type values xlink:actuate xlink:arcrole xlink:href xlink:role xlink:show xlink:title xlink:type xml:base xml:lang xml:space
audio	audio-level begin class dur end externalResourcesRequired id lsr:syncReference repeatCount repeatDur requiredExtensions requiredFeatures requiredFormats syncBehavior syncTolerance systemLanguage type xlink:actuate xlink:arcrole xlink:href xlink:role xlink:show xlink:title xlink:type xml:base xml:lang xml:space type
circle	audio-level class color color-rendering cx cy display display-align fill fill-opacity fill-rule nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable font-family font-size font-style font-weight font-variant id image-rendering line-increment lsr:rotation lsr:scale lsr:translation pointer-events r requiredExtensions requiredFeatures requiredFormats shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width systemLanguage text-anchor text-rendering transform vector-effect viewport-fill viewport-fill-opacity visibility xml:base xml:lang xml:space

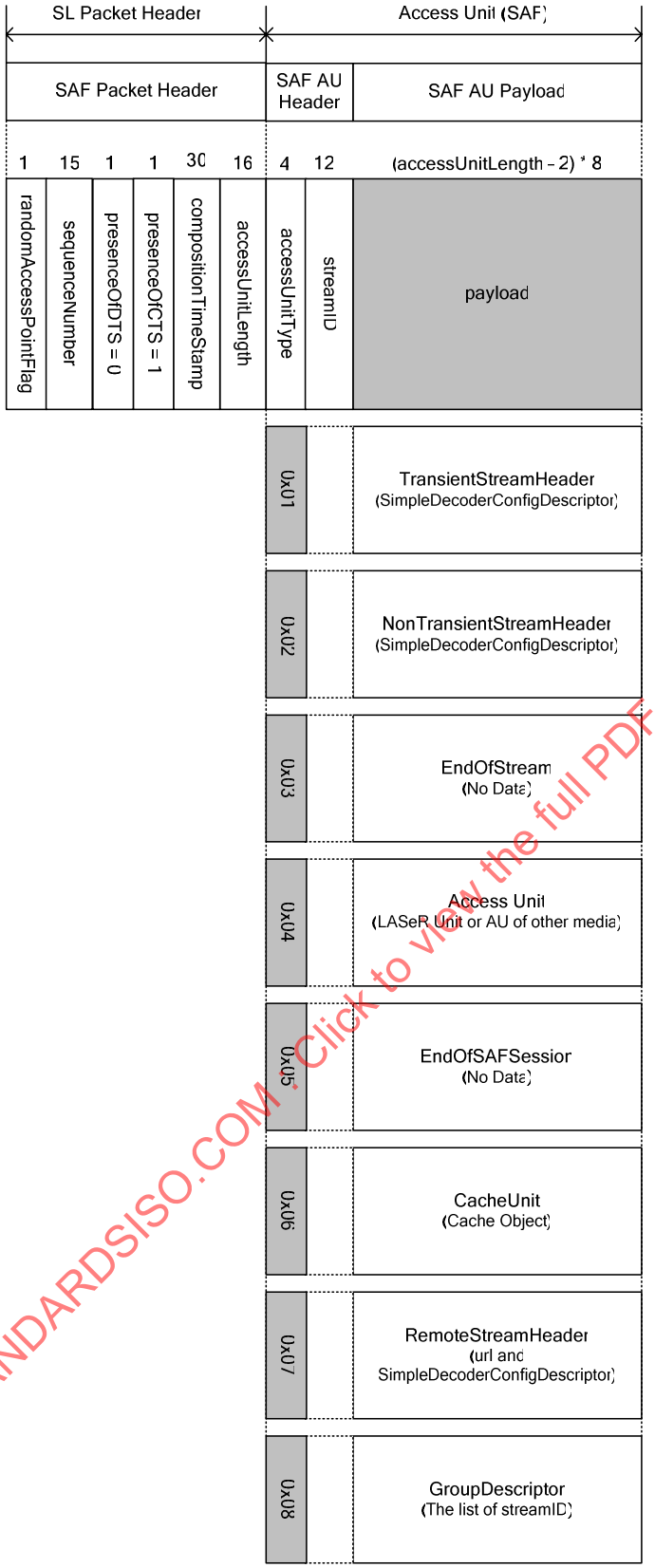
Element name	Attributes
lsr:conditional	id class style begin enabled externalResourcesRequired xlink:href xlink:title xlink:type xlink:role xlink:arcrole xlink:actuate xlink:show xml:base xml:lang xml:space
lsr:cursorManager	id class style xml:base xml:lang xml:space xlink:href xlink:title xlink:type xlink:role xlink:arcrole xlink:actuate xlink:show x y
defs	audio-level class color color-rendering display display-align fill fill-opacity fill-rule font-family font-size font-style font-variant font-weight id image-rendering line-increment pointer-events shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width text-anchor text-rendering vector-effect viewport-fill viewport-fill-opacity visibility xml:base xml:lang xml:space
desc	class id xml:base xml:lang xml:space
ellipse	audio-level class color color-rendering cx cy display display-align fill fill-opacity fill-rule nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable font-family font-size font-style font-variant font-weight id image-rendering line-increment lsr:rotation lsr:scale lsr:translation pointer-events requiredExtensions requiredFeatures requiredFormats rx ry shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width systemLanguage text-anchor text-rendering transform vector-effect viewport-fill viewport-fill-opacity visibility xml:base xml:lang xml:space
foreignObject	audio-level class color color-rendering display display-align externalResourcesRequired fill fill-opacity fill-rule nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable font-family font-size font-style font-variant font-weight height id image-rendering line-increment pointer-events requiredExtensions requiredFeatures requiredFormats shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width systemLanguage text-anchor text-rendering vector-effect viewport-fill viewport-fill-opacity visibility width x xml:base xml:lang xml:space y
g	id class style xml:base xml:lang xml:space audio-level color color-rendering display display-align fill fill-opacity fill-rule font-family font-size font-style text-decoration font-weight font-variant image-rendering line-increment pointer-events shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width text-anchor text-rendering viewport-fill viewport-fill-opacity vector-effect visibility lsr:rotation lsr:scale lsr:translation transform requiredFeatures requiredExtensions systemLanguage requiredFormats requiredFonts nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable focusHighlight externalResourcesRequired
image	class display externalResourcesRequired nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable height id lsr:rotation lsr:scale lsr:translation opacity pointer-events requiredExtensions requiredFeatures requiredFormats systemLanguage transform transformBehavior type visibility width x xlink:actuate xlink:arcrole xlink:href xlink:role xlink:show xlink:title xlink:type xml:base xml:lang xml:space y type preserveAspectRatio viewport-fill viewport-fill-opacity
line	audio-level class color color-rendering display display-align fill fill-opacity fill-rule nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable font-family font-size font-style font-variant font-weight id image-rendering line-increment lsr:rotation lsr:scale lsr:translation pointer-events requiredExtensions requiredFeatures requiredFormats shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width systemLanguage text-anchor text-rendering transform vector-effect viewport-fill viewport-fill-opacity visibility x1 x2 xml:base xml:lang xml:space y1 y2

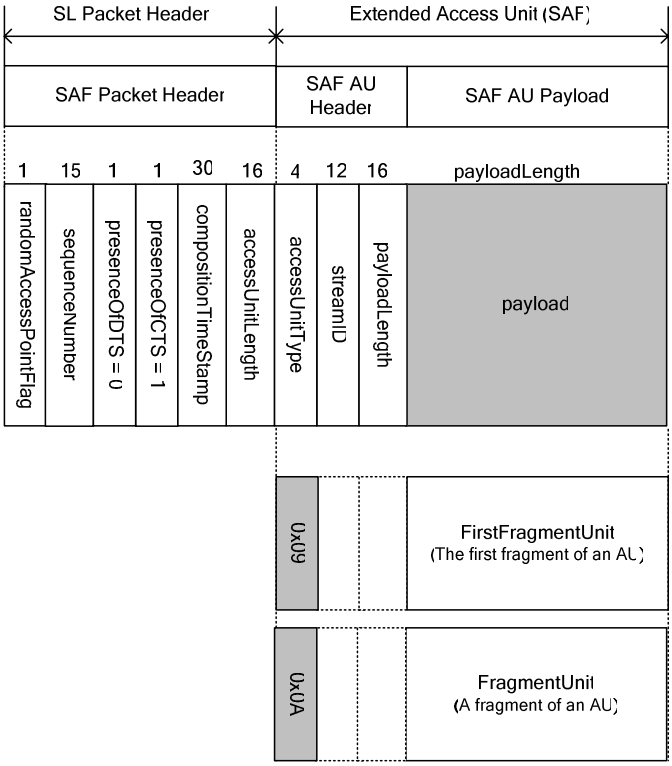
Element name	Attributes
linearGradient	audio-level class color color-rendering display display-align fill fill-opacity fill-rule font-family font-size font-style font-variant font-weight gradient-units id image-rendering line-increment pointer-events shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width text-anchor text-rendering vector-effect viewport-fill viewport-fill-opacity visibility x1 x2 xml:base xml:lang xml:space y1 y2
ev:listener	id enabled event handler observer phase propagate defaultAction target
metadata	class id xml:base xml:lang xml:space
mpath	class id xlink:actuate xlink:arcrole xlink:href xlink:role xlink:show xlink:title xlink:type xml:base xml:lang xml:space
path	audio-level class color color-rendering d display display-align fill fill-opacity fill-rule nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable font-family font-size font-style font-variant font-weight id image-rendering line-increment lsr:rotation lsr:scale lsr:translation pathLength pointer-events requiredExtensions requiredFeatures requiredFormats shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width systemLanguage text-anchor text-rendering transform vector-effect viewport-fill viewport-fill-opacity visibility xml:base xml:lang xml:space
polygon	audio-level class color color-rendering display display-align fill fill-opacity fill-rule nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable font-family font-size font-style font-variant font-weight id image-rendering line-increment lsr:rotation lsr:scale lsr:translation pointer-events points requiredExtensions requiredFeatures requiredFormats shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width systemLanguage text-anchor text-rendering transform vector-effect viewport-fill viewport-fill-opacity visibility xml:base xml:lang xml:space
polyline	audio-level class color color-rendering display display-align fill fill-opacity fill-rule nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable font-family font-size font-style font-variant font-weight id image-rendering line-increment lsr:rotation lsr:scale lsr:translation pointer-events points requiredExtensions requiredFeatures requiredFormats shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width systemLanguage text-anchor text-rendering transform vector-effect viewport-fill viewport-fill-opacity visibility xml:base xml:lang xml:space
radialGradient	audio-level class color color-rendering cx cy display display-align fill fill-opacity fill-rule font-family font-size font-style font-variant font-weight gradient-units id image-rendering line-increment pointer-events r shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width text-anchor text-rendering vector-effect viewport-fill viewport-fill-opacity visibility xml:base xml:lang xml:space
rect	audio-level class color color-rendering display display-align fill fill-opacity fill-rule nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable font-family font-size font-style font-variant font-weight height id image-rendering line-increment lsr:rotation lsr:scale lsr:translation pointer-events requiredExtensions requiredFeatures requiredFormats rx ry shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width systemLanguage text-anchor text-rendering transform vector-effect viewport-fill viewport-fill-opacity visibility width x xml:base xml:lang xml:space y

Element name	Attributes
lsr:rectClip	id class style xml:base xml:lang xml:space audio-level color color-rendering display display-align fill fill-opacity fill-rule font-family font-size font-style text-decoration font-weight font-variant image-rendering line-increment pointer-events shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width text-anchor text-rendering viewport-fill viewport-fill-opacity vector-effect visibility lsr:rotation lsr:scale lsr:translation transform requiredFeatures requiredExtensions systemLanguage requiredFormats requiredFonts nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable focusHighlight externalResourcesRequired size
script	begin class enabled externalResourcesRequired id type xlink:actuate xlink:arcrole xlink:href xlink:role xlink:show xlink:title xlink:type xml:base xml:lang xml:space type
lsr:selector	id class style xml:base xml:lang xml:space audio-level color color-rendering display display-align fill fill-opacity fill-rule font-family font-size font-style text-decoration font-weight font-variant image-rendering line-increment pointer-events shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width text-anchor text-rendering viewport-fill viewport-fill-opacity vector-effect visibility lsr:rotation lsr:scale lsr:translation transform requiredFeatures requiredExtensions systemLanguage requiredFormats requiredFonts nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable focusHighlight externalResourcesRequired choice
set	attributeName begin class dur enabled end fill id max min repeatCount repeatDur restart to xlink:actuate xlink:arcrole xlink:href xlink:role xlink:show xlink:title xlink:type xml:base xml:lang xml:space
lsr:simpleLayout	id class style xml:base xml:lang xml:space audio-level color color-rendering display display-align fill fill-opacity fill-rule font-family font-size font-style text-decoration font-weight font-variant image-rendering line-increment pointer-events shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width text-anchor text-rendering viewport-fill viewport-fill-opacity vector-effect visibility lsr:rotation lsr:scale lsr:translation transform requiredFeatures requiredExtensions systemLanguage requiredFormats requiredFonts nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable focusHighlight externalResourcesRequired size
stop	audio-level class color color-rendering display display-align fill fill-opacity fill-rule font-family font-size font-style font-variant font-weight id image-rendering line-increment offset pointer-events shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width text-anchor text-rendering vector-effect viewport-fill viewport-fill-opacity visibility xml:base xml:lang xml:space
svg	audio-level baseProfile class color color-rendering contentScriptType display display-align externalResourcesRequired fill fill-opacity fill-rule font-family font-size font-style font-variant font-weight height id image-rendering line-increment playbackOrder pointer-events preserveAspectRatio shape-rendering snapshotTime solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width syncBehaviorDefault syncToleranceDefault text-anchor text-rendering timeLineBegin vector-effect version viewBox viewport-fill viewport-fill-opacity visibility width xml:base xml:lang xml:space zoomAndPan

Element name	Attributes
switch	audio-level class color color-rendering display display-align externalResourcesRequired fill fill-opacity fill-rule nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable font-family font-size font-style font-variant font-weight id image-rendering line-increment lsr:rotation lsr:scale lsr:translation pointer-events requiredExtensions requiredFeatures requiredFormats shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width systemLanguage text-anchor text-rendering transform vector-effect viewport-fill viewport-fill-opacity visibility xml:base xml:lang xml:space
text	audio-level color color-rendering display display-align editable fill fill-opacity fill-rule nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable font-family font-size font-style font-variant font-weight image-rendering line-increment lsr:rotation lsr:scale lsr:translation pointer-events requiredExtensions requiredFeatures requiredFormats rotate shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width systemLanguage text-anchor text-rendering transform vector-effect viewport-fill viewport-fill-opacity visibility x y
title	class id xml:base xml:lang xml:space
tspan	audio-level class color color-rendering display display-align fill fill-opacity fill-rule nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable font-family font-size font-style font-variant font-weight id image-rendering line-increment pointer-events requiredExtensions requiredFeatures requiredFormats shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width systemLanguage text-anchor text-rendering vector-effect viewport-fill viewport-fill-opacity visibility xml:base xml:lang xml:space
use	audio-level class color color-rendering display display-align externalResourcesRequired fill fill-opacity fill-rule nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable font-family font-size font-style font-variant font-weight id image-rendering line-increment lsr:rotation lsr:scale lsr:translation overflow pointer-events requiredExtensions requiredFeatures requiredFormats shape-rendering solid-color solid-opacity stop-color stop-opacity stroke stroke-dasharray stroke-dashoffset stroke-linecap stroke-linejoin stroke-miterlimit stroke-opacity stroke-width systemLanguage text-anchor text-rendering transform vector-effect viewport-fill viewport-fill-opacity visibility x xlink:actuate xlink:arcrole xlink:href xlink:role xlink:show xlink:title xlink:type xml:base xml:lang xml:space y
video	audio-level begin display dur end externalResourcesRequired fullscreen nav-right nav-next nav-up nav-up-right nav-up-left nav-prev nav-down nav-down-right nav-down-left nav-left focusable height lsr:rotation lsr:scale lsr:syncReference lsr:translation overlay pointer-events repeatCount repeatDur requiredExtensions requiredFeatures requiredFormats syncBehavior syncTolerance systemLanguage transform transformBehavior type visibility width x xlink:actuate xlink:arcrole xlink:href xlink:role xlink:show xlink:title xlink:type y type preserveAspectRatio viewport-fill viewport-fill-opacity

In subclause 7.3 "SAF Packet", replace Figure 4, with:





Replace subclause 7.4.1 SAF Packet Header syntax with the following:

```
class SAF_PacketHeader {
        bit(1) randomAccessPointFlag;
        bit(15) sequenceNumber;
        const bit(1) presenceOfDTS = 0;
        const bit(1) presenceOfCTS = 1;
        bit(30) compositionTimeStamp;
        uint(16) accessUnitLength;
}
```

Replace subclause 7.4.2 "SAF Packet Header semantics" with the following:

`sequenceNumber` – if present, successive packets shall either have the same sequence number or the value be continuously incremented as a modulo counter. Note – when two packets have the same sequence number, one can be ignored. Sequence numbers are incremented per SAF packet.

`randomAccessPointFlag` – when set to one indicates that random access to the content of this elementary stream is possible here. For SAF packets of type TransientStreamHeader, NonTransientStreamHeader or RemoteStreamHeader, the value of this flag shall be ignored.

`compositionTimeStamp` – is a composition time stamp.

For SAF packets of type AccessUnit, the composition time tc of the first composition unit resulting from this packet is reconstructed from this composition time stamp according to the formula:

$$tc = (\texttt{compositionTimeStamp}/\texttt{timeStampResolution} + k * 2^{30}/\texttt{timeStampResolution})$$

where k is the number of times that the `compositionTimeStamp` counter has wrapped around. The value of this field from two different packets may be same, if their `streamIDs` are different.

For streams which would require a different decoding time stamp and composition time stamp, such as MPEG-4 Part 10 (AVC) streams, the packets shall be provided in decoding order with composition time stamps, which means that time stamps may not be monotonically growing.

For SAF packets of type cacheUnit, this field specifies the validity period in second. In this case, the value 0 is reserved and the value 0x3FFFFFFF means that the Cache Unit never expires.

For SAF packets of type TransientStreamHeader, NonTransientStreamHeader or RemoteStreamHeader, this field specifies when the packet shall be processed.

When TransientStreamHeader, NonTransientStreamHeader or RemoteStreamHeader using a stream ID already in use are received, they shall be ignored by the terminal.
`accessUnitLength` – is the length in bytes of the SAF access unit conveyed in the SAF packet. The value of this field shall be at least 2. Value 1 is reserved for future ISO use. Value 0 signals that the payload of this SAF Packet is a SAF extended AU, as specified in subclause 7.6.
Replace subclause 7.5.2 "SAF Access Unit Semantics" with the following:

7.5.2 Semantics

`accessUnitType` – an indication about the type of the payload. Detailed values of accessUnitType and the data corresponding to each type are defined in Table 8

Table 8 — accessUnitType values and corresponding data in the payload

Value	Type of access unit payload	Data in payload
0x00	Reserved	-
0x01	TransientStreamHeader	A SimpleDecoderConfigDescriptor
0x02	NonTransientStreamHeader	A SimpleDecoderConfigDescriptor
0x03	EndofStream	(no data)
0x04	AccessUnit	An Access Unit
0x05	EndOfSAFSession	(no data)
0x06	CacheUnit	A cache object
0x07	RemoteStreamHeader	An url and a SimpleDecoderConfigDescriptor
0x08 ~ 0x0F	Reserved	-

`streamID` – the reference of the media stream this AU belongs to. This identifier is local to the current SAF session.

`payload` – the data part of the access unit. The size of the payload is signalled by the accessUnitLength field in the packet header as specified in 7.4. The type of data in this field is varied by accessUnitType as defined in Table 8.

For values of `safAU.accessUnitType` that refer to TransientStreamHeader and NonTransientStreamHeader, the `payload` shall convey a SimpleDecoderConfigDescriptor whose syntax and semantics is specified in 7.6.

A TransientStreamHeader shall be used to indicate that the stream shall be used once and by only one media element. Continuous media should be marked as transient.

NOTE Implementations may optimize the resources for a stream using TransientStreamHeader as soon as no more media element references the stream.

For values of `safAU.accessUnitType` that refer to LASeR access unit or cache unit, the `payload` shall convey a access unit or cache unit which syntax and semantics are specified in this clause.

For values of `safAU.accessUnitType` that refer to an access unit, the `payload` shall convey an access unit for specific media whose syntax and semantics is opaque to this standard.

In subclause 7.8.2, change the style of "with the addition of an url" to normal.

In subclause 7.9 Cache Unit, replace:

After the end time, the cache object is expired and its SAF content cannot be executed.

with:

After the end time, the cache object is expired and its content cannot be executed.

In subclause 7.9.2 Cache Unit Semantics, remove:

The payload data shall replace the stored presentation referenced by the url of this cache unit when the `safAU.accessUnitType` is `0x06`. Otherwise, the payload data shall be appended to the existing presentation.

Create subclause 7.12 "SAF Extended Access Unit":

7.12 SAF Extended Access Unit

7.12.1 Syntax

```
class safXAU {
  bit(4) accessUnitType;
  bit(12) streamID;
  bit(16) payloadLength;
  byte(8)[payloadLength] payload;
}
```

7.12.2 Semantics

The value `accessUnitLength` in SAF Packets containing Extended Access Units shall be 0.

`accessUnitType` – the semantic is the same as in subclause 7.5.2.

`streamID` – the semantic is the same as in subclause 7.5.2.

`payload` – the data part of the access unit. The size of the payload is signalled in `payloadLength`. The type of data in this field is varied by `accessUnitType` as defined in Table 8 and in subclause 7.5.2.

Add to subclause 7.11 EndOfSAFSession:

When a SAFSession is closed (either by *EndOfSAFSession*, or by other means), all unused transient media stream originated in this SAF session may be discarded.

We call an unused media stream a stream that has no elements in the scene tree that reference the streamID of this media stream. For efficiency the content of <lsr:conditional> shall not be taken into account regarding streamID references.

In subclause 8.1 "LASeR Mini Overview", add the following paragraph:

The purpose of LASeR mini is to allow very constrained implementations of LASeR, including J2ME implementations. One specific feature of mini is that the implementation does not need to implement 2 trees, one DOM tree and one composition tree, or otherwise keep the memory of the decoded value for each attribute.

In subclause 8.2.2.5 "LASeR Mini animations", add the following paragraph:

Any content requiring the restoration of a DOM value of an attribute after it has been animated is non conformant. Authors shall make sure that, when deleting an animation or replacing an xlink:href, any previously animated value is made irrelevant by any appropriate mean (e.g. deletion of the target element, replacement of the animated value, etc.).

Create subclause 8.2.2.7 "LASeR Mini LASeR Commands"with:

8.2.2.7 LASeR Commands

color-rendering, shape-rendering, text-rendering, image-rendering are not updatable in this profile.

In subclause 8.2.4 « Profile Definition », replace table with:

Element name	Attributes
a	id externalResourcesRequired display visibility requiredFeatures requiredExtensions systemLanguage requiredFormats transform xlink:href
animate	id lsr:enabled begin end dur repeatCount repeatDur restart **attributeName fill="freeze"** to **xlink:href(no replace)** from by values calcMode keyTimes keySplines **additive="replace"** accumulate
animateColor	id lsr:enabled begin end dur repeatCount repeatDur restart **attributeName fill="freeze"**to **xlink:href(no replace)** from by values calcMode keyTimes keySplines **additive="replace"** accumulate
animateMotion	id path keyPoints rotate lsr:enabled begin end dur repeatCount repeatDur restart **fill="freeze"** to **xlink:href(no replace)** from by values calcMode keyTimes keySplines **additive="replace"** accumulate
animateTransform	id type lsr:enabled begin end dur repeatCount repeatDur restart attributeName **fill="freeze"**to **xlink:href(no replace)** from by values calcMode keyTimes keySplines **additive="replace"** accumulate
audio	id externalResourcesRequired begin end clipBegin clipEnd repeatCount repeatDur syncBehavior syncTolerance audio-level syncReference requiredFeatures requiredExtensions systemLanguage requiredFormats xlink:href
circle	id cx cy r display fill fill-opacity fill-rule stroke stroke-opacity stroke-width visibility requiredFeatures requiredExtensions systemLanguage requiredFormats transform
conditional	externalResourcesRequired id begin type lsr:enabled
cursorManager	id x y xlink:href
defs	id
desc	id
ellipse	id rx ry cx cy display fill fill-opacity fill-rule stroke stroke-opacity stroke-width visibility requiredFeatures requiredExtensions systemLanguage requiredFormats transform
foreignObject	id externalResourcesRequired width height x y viewport-fill viewport-fill-opacity display visibility requiredFeatures requiredExtensions systemLanguage requiredFormats
g	id externalResourcesRequired display visibility requiredFeatures requiredExtensions systemLanguage requiredFormats transform
image	id externalResourcesRequired width height x y **transformBehavior(no geometric)** opacity display visibility requiredFeatures requiredExtensions systemLanguage requiredFormats transform xlink:href
line	id x1 y1 x2 y2 display stroke stroke-opacity stroke-width visibility requiredFeatures requiredExtensions systemLanguage requiredFormats transform
linearGradient	id gradient-units x1 x2 y1 y2 display visibility
ev:listener	id lsr:enabled delay event observer timeAttribute handler propagate defaultAction target
metadata	id
mpath	id xlink:href
path	id d display fill fill-opacity fill-rule stroke stroke-opacity stroke-width visibility requiredFeatures requiredExtensions systemLanguage requiredFormats transform
polygon	id points display fill fill-opacity fill-rule stroke stroke-opacity stroke-width visibility requiredFeatures requiredExtensions systemLanguage requiredFormats transform
polyline	id points display fill fill-opacity fill-rule stroke stroke-opacity stroke-width visibility requiredFeatures requiredExtensions systemLanguage requiredFormats transform
radialGradient	id gradient-units cx cy r display visibility
rect	id width height x y rx ry display fill fill-opacity fill-rule stroke stroke-opacity stroke-width visibility requiredFeatures requiredExtensions systemLanguage requiredFormats transform
rectClip	id externalResourcesRequired size display visibility requiredFeatures requiredExtensions systemLanguage requiredFormats transform
selector	id externalResourcesRequired choice display visibility requiredFeatures requiredExtensions systemLanguage requiredFormats transform
set	id lsr:enabled begin end dur repeatCount repeatDur restart **attributeName fill="freeze"** to **xlink:href(no replace)**
simpleLayout	id externalResourcesRequired delta display visibility requiredFeatures requiredExtensions systemLanguage requiredFormats transform
stop	id offset display stop-color stop-opacity visibility
svg	id externalResourcesRequired **width(not animatable if gradient with gradientUnits="userSpaceOnUse") height(not animatable if gradient with gradientUnits="userSpaceOnUse") viewBox(not animatable if gradient with gradientUnits="userSpaceOnUse")** preserveAspectRatio zoomAndPan viewport-fill viewport-fill-opacity syncBehavior syncBehaviorDefault syncTolerance syncToleranceDefault display pointer-events visibility color-rendering shape-rendering image-rendering text-rendering
switch	id externalResourcesRequired display visibility requiredFeatures requiredExtensions systemLanguage requiredFormats
text	id display display-align fill fill-opacity fill-rule font-family font-size font-style font-weight line-increment stroke stroke-opacity stroke-width text-anchor visibility requiredFeatures requiredExtensions systemLanguage requiredFormats editable x y transform text-decoration
title	id

tspan	id display fill fill-opacity fill-rule font-family font-size font-style font-weight line-increment stroke stroke-opacity stroke-width text-anchor visibility requiredFeatures requiredExtensions systemLanguage requiredFormats text-decoration
use	id externalResourcesRequired overflow x y display visibility requiredFeatures requiredExtensions systemLanguage requiredFormats transform xlink:href
video	id externalResourcesRequired begin end clipBegin clipEnd repeatCount repeatDur syncBehavior syncBehaviorDefault syncTolerance syncToleranceDefault audio-level syncReference requiredFeatures requiredExtensions systemLanguage requiredFormats xlink:href width height x y **overlay="top | LASeR_fullscreen" transformBehavior(no geometric)** transform

In subclause 12.1.4 "Animations and updates", replace Table 11 with the following:

Type	Encoded value
ANIMTYPE_string	0
ANIMTYPE_float	1
ANIMTYPE_path	2
ANIMTYPE_pointSeq	3
ANIMTYPE_fraction	4
ANIMTYPE_color	5
ANIMTYPE_enum	6
reserved	7
ANIMTYPE_floats	8
ANIMTYPE_point	9
ANIMTYPE_id	10
ANIMTYPE_font	11
ANIMTYPE_uri	12

Replace Table 12 with the following:

Attribute name	Encoded type for animation	Attribute name	Encoded type for animation
a.target	ANIMTYPE_string	r	ANIMTYPE_float
audio-level	ANIMTYPE_fraction	rotate	ANIMTYPE_float
choice	ANIMTYPE_enum	rx	ANIMTYPE_float
color	ANIMTYPE_color	ry	ANIMTYPE_float
color-rendering	ANIMTYPE_enum	shape-rendering	ANIMTYPE_enum
cx	ANIMTYPE_float	size	ANIMTYPE_point
cy	ANIMTYPE_float	stop-color	ANIMTYPE_color
d	ANIMTYPE_path	stop-opacity	ANIMTYPE_fraction
display	ANIMTYPE_enum	stroke	ANIMTYPE_color
display-align	ANIMTYPE_enum	stroke-dasharray	ANIMTYPE_floats
editable	ANIMTYPE_enum	stroke-dashoffset	ANIMTYPE_float
fill	ANIMTYPE_color	stroke-linecap	ANIMTYPE_enum
fill-opacity	ANIMTYPE_fraction	stroke-linejoin	ANIMTYPE_enum
fill-rule	ANIMTYPE_enum	stroke-miterlimit	ANIMTYPE_float
nav-next	ANIMTYPE_id	stroke-opacity	ANIMTYPE_fraction
nav-prev	ANIMTYPE_id	stroke-width	ANIMTYPE_float
nav-right	ANIMTYPE_id	target	ANIMTYPE_string
nav-up	ANIMTYPE_id	text-anchor	ANIMTYPE_enum
nav-up-right	ANIMTYPE_id	transform	ANIMTYPE_floats
nav-up-left	ANIMTYPE_id	type	ANIMTYPE_enum
nav-down	ANIMTYPE_id	vector-effect	ANIMTYPE_enum
nav-down-right	ANIMTYPE_id	viewBox	ANIMTYPE_floats
nav-down-left	ANIMTYPE_id	viewport-fill	ANIMTYPE_color
nav-left	ANIMTYPE_id	viewport-fill-opacity	ANIMTYPE_fraction
focusable	ANIMTYPE_id	visibility	ANIMTYPE_enum
font-family	ANIMTYPE_font	width	ANIMTYPE_float
font-size	ANIMTYPE_float	x	ANIMTYPE_float
font-style	ANIMTYPE_enum	x1	ANIMTYPE_float

font-weight	ANIMTYPE_enum	x2	ANIMTYPE_float
gradientUnits	ANIMTYPE_enum	xlink:href	ANIMTYPE_uri
height	ANIMTYPE_float	y	ANIMTYPE_float
image-rendering	ANIMTYPE_enum	y1	ANIMTYPE_float
listener.target	ANIMTYPE_id	y2	ANIMTYPE_float

opacity	ANIMTYPE_fraction
pathLength	ANIMTYPE_float
pointer-events	ANIMTYPE_ints
points	ANIMTYPE_pointSeq
preserveAspectRatio	ANIMTYPE_enum

Replace subclause 12.1.5 "Encoding of enumerations" with the following:

The SDL described in subclause 12.2 makes use of the following syntax: "// Enumeration:" followed by a space separated list of "string{value}", where *value* is the decimal value used to encode the *string* in the bit field following on the next line. Values not listed but encodable in this bit field are ISO reserved.

In subclause 12.2 "Binary Syntax", replace the content of subclause 12.2 by the following:

12.2.1 Main Structure

```
class element_a {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  bit(1) externalResourcesRequired;
  bit(1) has_target;
  if(has_target) {
    attr_custom_byteAlignedString target;
  }
  bit(1) has_href;
  if(has_href) {
    attr_custom_anyURI href;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class privateAttributeContainer {
  bit(4) ch4;
  switch(ch4){
    case 0:
      privateAnyXMLAttribute anyXML;
      break;
    case 1:
      privateOpaqueAttribute opaque;
      break;
    case 2:
      attr_any reserved;
      break;
    default:
      attr_custom_extension ext;
      break;
    }
}
class elements {
  bit(6) ch4;
  switch(ch4){
    case 0:
      element_a a;
      break;
    case 1:
      element_animate animate;
```

```
      break;
    case 2:
      element_animate animateColor;
      break;
    case 3:
      element_animateMotion animateMotion;
      break;
    case 4:
      element_animateTransform animateTransform;
      break;
    case 5:
      element_audio audio;
      break;
    case 6:
      element_circle circle;
      break;
    case 7:
      element_defs defs;
      break;
    case 8:
      element_desc_metaData_title desc;
      break;
    case 9:
      element_ellipse ellipse;
      break;
    case 10:
      element_foreignObject foreignObject;
      break;
    case 11:
      element_g g;
      break;
    case 12:
      element_image image;
      break;
    case 13:
      element_line line;
      break;
    case 14:
      element_linearGradient linearGradient;
      break;
    case 15:
      element_desc_metaData_title metadata;
      break;
    case 16:
      element_mpath mpath;
      break;
    case 17:
      element_path path;
      break;
    case 18:
      element_polygon polygon;
      break;
    case 19:
      element_polygon polyline;
      break;
    case 20:
      element_radialGradient radialGradient;
      break;
    case 21:
      element_rect rect;
      break;
    case 22:
      element_sameg sameg;
      break;
    case 23:
      element_sameline sameline;
      break;
    case 24:
      element_samepath samepath;
      break;
    case 25:
      element_samepathfill samepathfill;
      break;
    case 26:
      element_samepolygon samepolygon;
      break;
    case 27:
      element_samepolygonfill samepolygonfill;
      break;
    case 28:
      element_samepolygonstroke samepolygonstroke;
      break;
    case 29:
      element_samepolygon samepolyline;
      break;
    case 30:
      element_samepolygonfill samepolylinefill;
      break;
    case 31:
      element_samepolygonstroke samepolylinestroke;
```

```
      break;
    case 32:
      element_samerect samerect;
      break;
    case 33:
      element_samerectfill samerectfill;
      break;
    case 34:
      element_sametext sametext;
      break;
    case 35:
      element_sametextfill sametextfill;
      break;
    case 36:
      element_sameuse sameuse;
      break;
    case 37:
      element_script script;
      break;
    case 38:
      element_set set;
      break;
    case 39:
      element_stop stop;
      break;
    case 40:
      element_switch switch;
      break;
    case 41:
      element_text text;
      break;
    case 42:
      element_desc_metaData_title title;
      break;
    case 43:
      element_tspan tspan;
      break;
    case 44:
      element_use use;
      break;
    case 45:
      element_video video;
      break;
    case 46:
      element_listener listener;
      break;
    case 47:
      element_conditional conditional;
      break;
    case 48:
      element_cursorManager cursorManager;
      break;
    case 49:
      element_any extElement;
      break;
    case 50:
      privateElementContainer privateElementContainer;
      break;
    case 51:
      element_rectClip rectClip;
      break;
    case 52:
      element_selector selector;
      break;
    case 53:
      element_simpleLayout simpleLayout;
      break;
    case 54:
      attr_custom_byteAlignedString textContent;
      break;
  }
}
class element_animate {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_attributeName;
  if(has_attributeName) {
    attr_AttributeName attributeName;
  }
  bit(1) has_accumulate;
  if(has_accumulate) {
    attr_accumulate accumulate;
  }
  bit(1) has_additive;
```

```
  if(has_additive) {
    attr_additive additive;
  }
  bit(1) has_by;
  if(has_by) {
    attr_custom_AnimatedValue by;
  }
  bit(1) has_calcMode;
  if(has_calcMode) {
    attr_calcMode calcMode;
  }
  bit(1) has_from;
  if(has_from) {
    attr_custom_AnimatedValue from;
  }
  bit(1) has_keySplines;
  if(has_keySplines) {
    attr_custom_fraction12List keySplines;
  }
  bit(1) has_keyTimes;
  if(has_keyTimes) {
    attr_custom_fraction12List keyTimes;
  }
  bit(1) has_values;
  if(has_values) {
    attr_custom_AnimatedValues values;
  }
  bit(1) has_attributeType;
  if(has_attributeType) {
    attr_attributeType attributeType;
  }
  bit(1) has_begin;
  if(has_begin) {
    attr_smil_times begin;
  }
  bit(1) has_dur;
  if(has_dur) {
    attr_time dur;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_animFill fill;
  }
  bit(1) has_repeatCount;
  if(has_repeatCount) {
    attr_repeatCount repeatCount;
  }
  bit(1) has_repeatDur;
  if(has_repeatDur) {
    attr_repeatDur repeatDur;
  }
  bit(1) has_restart;
  if(has_restart) {
    attr_restart restart;
  }
  bit(1) has_to;
  if(has_to) {
    attr_custom_AnimatedValue to;
  }
  bit(1) has_href;
  if(has_href) {
    attr_custom_anyURI href;
  }
  bit(1) enabled;
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_animateMotion {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_accumulate;
  if(has_accumulate) {
    attr_accumulate accumulate;
  }
  bit(1) has_additive;
  if(has_additive) {
    attr_additive additive;
  }
  bit(1) has_by;
  if(has_by) {
    attr_custom_AnimatedValue by;
```

```
  }
  bit(1) has_calcMode;
  if(has_calcMode) {
    attr_calcMode calcMode;
  }
  bit(1) has_from;
  if(has_from) {
    attr_custom_AnimatedValue from;
  }
  bit(1) has_keySplines;
  if(has_keySplines) {
    attr_custom_fraction12List keySplines;
  }
  bit(1) has_keyTimes;
  if(has_keyTimes) {
    attr_custom_fraction12List keyTimes;
  }
  bit(1) has_values;
  if(has_values) {
    attr_custom_AnimatedValues values;
  }
  bit(1) has_attributeType;
  if(has_attributeType) {
    attr_attributeType attributeType;
  }
  bit(1) has_begin;
  if(has_begin) {
    attr_smil_times begin;
  }
  bit(1) has_dur;
  if(has_dur) {
    attr_time dur;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_animFill fill;
  }
  bit(1) has_repeatCount;
  if(has_repeatCount) {
    attr_repeatCount repeatCount;
  }
  bit(1) has_repeatDur;
  if(has_repeatDur) {
    attr_repeatDur repeatDur;
  }
  bit(1) has_restart;
  if(has_restart) {
    attr_restart restart;
  }
  bit(1) has_to;
  if(has_to) {
    attr_custom_AnimatedValue to;
  }
  bit(1) has_keyPoints;
  if(has_keyPoints) {
    attr_floatList keyPoints;
  }
  bit(1) has_path;
  if(has_path) {
    attr_custom_path path;
  }
  bit(1) has_rotate;
  if(has_rotate) {
    attr_rotate rotate;
  }
  bit(1) has_href;
  if(has_href) {
    attr_custom_anyURI href;
  }
  bit(1) enabled;
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_animateTransform {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_attributeName;
  if(has_attributeName) {
    attr_AttributeName attributeName;
  }
  attr_rotscatra type;
```

```
  bit(1) has_accumulate;
  if(has_accumulate) {
    attr_accumulate accumulate;
  }
  bit(1) has_additive;
  if(has_additive) {
    attr_additive additive;
  }
  bit(1) has_by;
  if(has_by) {
    attr_custom_AnimatedValue by;
  }
  bit(1) has_calcMode;
  if(has_calcMode) {
    attr_calcMode calcMode;
  }
  bit(1) has_from;
  if(has_from) {
    attr_custom_AnimatedValue from;
  }
  bit(1) has_keySplines;
  if(has_keySplines) {
    attr_custom_fraction12List keySplines;
  }
  bit(1) has_keyTimes;
  if(has_keyTimes) {
    attr_custom_fraction12List keyTimes;
  }
  bit(1) has_values;
  if(has_values) {
    attr_custom_AnimatedValues values;
  }
  bit(1) has_attributeType;
  if(has_attributeType) {
    attr_attributeType attributeType;
  }
  bit(1) has_begin;
  if(has_begin) {
    attr_smil_times begin;
  }
  bit(1) has_dur;
  if(has_dur) {
    attr_time dur;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_animFill fill;
  }
  bit(1) has_repeatCount;
  if(has_repeatCount) {
    attr_repeatCount repeatCount;
  }
  bit(1) has_repeatDur;
  if(has_repeatDur) {
    attr_repeatDur repeatDur;
  }
  bit(1) has_restart;
  if(has_restart) {
    attr_restart restart;
  }
  bit(1) has_to;
  if(has_to) {
    attr_custom_AnimatedValue to;
  }
  bit(1) has_href;
  if(has_href) {
    attr_custom_anyURI href;
  }
  bit(1) enabled;
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_audio {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_begin;
  if(has_begin) {
    attr_smil_times begin;
  }
  bit(1) has_dur;
  if(has_dur) {
```

```
    attr_time dur;
  }
  bit(1) externalResourcesRequired;
  bit(1) has_repeatCount;
  if(has_repeatCount) {
    attr_repeatCount repeatCount;
  }
  bit(1) has_repeatDur;
  if(has_repeatDur) {
    attr_repeatDur repeatDur;
  }
  bit(1) has_restart;
  if (has_restart) {
    attr_restart restart;
}
  bit(1) has_syncBehavior;
  if(has_syncBehavior) {
    attr_syncBehavior syncBehavior;
  }
  bit(1) has_syncTolerance;
  if(has_syncTolerance) {
    attr_syncTolerance syncTolerance;
  }
  bit(1) has_type;
  if(has_type) {
    attr_custom_byteAlignedString type;
  }
  bit(1) has_href;
  if(has_href) {
    attr_custom_anyURI href;
  }
  bit(1) has_clipBegin;
  if(has_clipBegin) {
    attr_time clipBegin;
  }
  bit(1) has_clipEnd;
  if(has_clipEnd) {
    attr_time clipEnd;
  }
  bit(1) has_syncReference;
  if(has_syncReference) {
    attr_custom_anyURI syncReference;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_circle {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  bit(1) has_cx;
  if(has_cx) {
    attr_custom_coordinate cx;
  }
  bit(1) has_cy;
  if(has_cy) {
    attr_custom_coordinate cy;
  }
  attr_custom_coordinate r;
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_defs {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
```

```
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_desc_metaData_title {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_ellipse {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  bit(1) has_cx;
  if(has_cx) {
    attr_custom_coordinate cx;
  }
  bit(1) has_cy;
  if(has_cy) {
    attr_custom_coordinate cy;
  }
  attr_custom_coordinate rx;
  attr_custom_coordinate ry;
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_foreignObject {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  bit(1) externalResourcesRequired;
  attr_custom_coordinate height;
  attr_custom_coordinate width;
  bit(1) has_x;
  if(has_x) {
    attr_custom_coordinate x;
  }
  bit(1) has_y;
  if(has_y) {
    attr_custom_coordinate y;
  }
```

```
    bit(1) has_href;
    if(has_href) {
      attr_custom_anyURI href;
    }
    bit(1) has_attr_any;
    if(has_attr_any) {
      attr_any any;
    }
    bit(1) opt_group;
    if(opt_group) {
      vluimsbf5 occ1;
      for(int t=0;t<occ1;t++) {
        privateElementContainer child0[[t]];
      }
    }
  }
  class element_g {
    bit(1) has_id;
    if(has_id) {
      attr_custom_ID id;
    }
    bit(1) has_rare;
    if(has_rare) {
      attr_custom_rare rare;
    }
    bit(1) has_fill;
    if(has_fill) {
      attr_custom_paint fill;
    }
    bit(1) has_stroke;
    if(has_stroke) {
      attr_custom_paint stroke;
    }
    bit(1) externalResourcesRequired;
    bit(1) has_attr_any;
    if(has_attr_any) {
      attr_any any;
    }
    object_content child0;
  }
  class element_image {
    bit(1) has_id;
    if(has_id) {
      attr_custom_ID id;
    }
    bit(1) has_rare;
    if(has_rare) {
      attr_custom_rare rare;
    }
    bit(1) externalResourcesRequired;
    bit(1) has_height;
    if(has_height) {
      attr_custom_coordinate height;
    }
    bit(1) has_opacity;
    if(has_opacity) {
      attr_custom_0to1float opacity;
    }
    bit(1) has_preserveAspectRatio;
    if(has_preserveAspectRatio) {
      attr_preserveAspectRatio preserveAspectRatio;
    }
    bit(1) has_type;
    if(has_type) {
      attr_custom_byteAlignedString type;
    }
    bit(1) has_width;
    if(has_width) {
      attr_custom_coordinate width;
    }
    bit(1) has_x;
    if(has_x) {
      attr_custom_coordinate x;
    }
    bit(1) has_y;
    if(has_y) {
      attr_custom_coordinate y;
    }
    bit(1) has_href;
    if(has_href) {
      attr_custom_anyURI href;
    }
    bit(1) has_transformBehavior;
    if(has_transformBehavior) {
      attr_transformBehavior transformBehavior;
    }
    bit(1) has_attr_any;
    if(has_attr_any) {
      attr_any any;
    }
```

```
  object_content child0;
}
class element_line {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  bit(1) has_x1;
  if(has_x1) {
    attr_custom_coordinate x1;
  }
  attr_custom_coordinate x2;
  bit(1) has_y1;
  if(has_y1) {
    attr_custom_coordinate y1;
  }
  attr_custom_coordinate y2;
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_linearGradient {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  bit(1) has_gradientUnits;
  if(has_gradientUnits) {
    attr_gradientUnits gradientUnits;
  }
  bit(1) has_x1;
  if(has_x1) {
    attr_custom_coordinate x1;
  }
  bit(1) has_x2;
  if(has_x2) {
    attr_custom_coordinate x2;
  }
  bit(1) has_y1;
  if(has_y1) {
    attr_custom_coordinate y1;
  }
  bit(1) has_y2;
  if(has_y2) {
    attr_custom_coordinate y2;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_mpath {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_href;
  if(has_href) {
    attr_custom_anyURI href;
```

```
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_path {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  attr_custom_path d;
  bit(1) has_pathLength;
  if(has_pathLength) {
    attr_custom_fixed_16_8 pathLength;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_polygon {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  attr_custom_pointSequence points;
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_radialGradient {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  bit(1) has_cx;
  if(has_cx) {
    attr_custom_coordinate cx;
  }
  bit(1) has_cy;
  if(has_cy) {
    attr_custom_coordinate cy;
  }
  bit(1) has_gradientUnits;
  if(has_gradientUnits) {
    attr_gradientUnits gradientUnits;
  }
  bit(1) has_r;
  if(has_r) {
```

```
    attr_custom_coordinate r;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_rect {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  attr_custom_coordinate height;
  bit(1) has_rx;
  if(has_rx) {
    attr_custom_coordinate rx;
  }
  bit(1) has_ry;
  if(has_ry) {
    attr_custom_coordinate ry;
  }
  attr_custom_coordinate width;
  bit(1) has_x;
  if(has_x) {
    attr_custom_coordinate x;
  }
  bit(1) has_y;
  if(has_y) {
    attr_custom_coordinate y;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_sameg {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  objectSame_content child0;
}
class element_sameline {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_x1;
  if(has_x1) {
    attr_custom_coordinate x1;
  }
  attr_custom_coordinate x2;
  bit(1) has_y1;
  if(has_y1) {
    attr_custom_coordinate y1;
  }
  attr_custom_coordinate y2;
  objectSame_content child0;
}
class element_samepath {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  attr_custom_path d;
  objectSame_content child0;
}
class element_samepathfill {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
```

```
  attr_custom_path d;
  objectSame_content child0;
}
class element_samepolygon {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  attr_custom_pointSequence points;
  objectSame_content child0;
}
class element_samepolygonfill {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  attr_custom_pointSequence points;
  objectSame_content child0;
}
class element_samepolygonstroke {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  attr_custom_pointSequence points;
  objectSame_content child0;
}
class element_samerect {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  attr_custom_coordinate height;
  attr_custom_coordinate width;
  bit(1) has_x;
  if(has_x) {
    attr_custom_coordinate x;
  }
  bit(1) has_y;
  if(has_y) {
    attr_custom_coordinate y;
  }
  objectSame_content child0;
}
class element_samerectfill {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  attr_custom_coordinate height;
  attr_custom_coordinate width;
  bit(1) has_x;
  if(has_x) {
    attr_custom_coordinate x;
  }
  bit(1) has_y;
  if(has_y) {
    attr_custom_coordinate y;
  }
  objectSame_content child0;
}
class element_sametext {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_x;
  if(has_x) {
    attr_coordinateList x;
  }
  bit(1) has_y;
  if(has_y) {
    attr_coordinateList y;
  }
  objectSame_content child0;
}
class element_sametextfill {
  bit(1) has_id;
```

```
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_x;
  if(has_x) {
    attr_coordinateList x;
  }
  bit(1) has_y;
  if(has_y) {
    attr_coordinateList y;
  }
  objectSame_content child0;
}
class element_sameuse {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_href;
  if(has_href) {
    attr_custom_anyURI href;
  }
  objectSame_content child0;
}
class element_script {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) externalResourcesRequired;
  bit(1) has_type;
  if(has_type) {
     attr_script type;
  }
  bit(1) has_href;
  if(has_href) {
    attr_custom_anyURI href;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_set {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_attributeName;
  if(has_attributeName) {
    attr_AttributeName attributeName;
  }
  bit(1) has_attributeType;
  if(has_attributeType) {
    attr_attributeType attributeType;
  }
  bit(1) has_begin;
  if(has_begin) {
    attr_smilTimes begin;
  }
  bit(1) has_dur;
  if(has_dur) {
    attr_time dur;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_animFill fill;
  }
  bit(1) has_repeatCount;
  if(has_repeatCount) {
    attr_repeatCount repeatCount;
  }
  bit(1) has_repeatDur;
  if(has_repeatDur) {
    attr_repeatDur repeatDur;
  }
  bit(1) has_restart;
```

```
    if(has_restart) {
      attr_restart restart;
    }
    bit(1) has_to;
    if(has_to) {
      attr_custom_AnimatedValue to;
    }
    bit(1) has_href;
    if(has_href) {
      attr_custom_anyURI href;
    }
    bit(1) enabled;
    bit(1) has_attr_any;
    if(has_attr_any) {
      attr_any any;
    }
    object_content child0;
  }
  class element_stop {
    bit(1) has_id;
    if(has_id) {
      attr_custom_ID id;
    }
    bit(1) has_rare;
    if(has_rare) {
      attr_custom_rare rare;
    }
    bit(1) has_fill;
    if(has_fill) {
      attr_custom_paint fill;
    }
    bit(1) has_stroke;
    if(has_stroke) {
      attr_custom_paint stroke;
    }
    attr_custom_fixed_16_8 offset;
    bit(1) has_attr_any;
    if(has_attr_any) {
      attr_any any;
    }
    object_content child0;
  }
  class element_switch {
    bit(1) has_id;
    if(has_id) {
      attr_custom_ID id;
    }
    bit(1) has_rare;
    if(has_rare) {
      attr_custom_rare rare;
    }
    bit(1) has_fill;
    if(has_fill) {
      attr_custom_paint fill;
    }
    bit(1) has_stroke;
    if(has_stroke) {
      attr_custom_paint stroke;
    }
    bit(1) externalResourcesRequired;
    bit(1) has_attr_any;
    if(has_attr_any) {
      attr_any any;
    }
    object_content child0;
  }
  class element_text {
    bit(1) has_id;
    if(has_id) {
      attr_custom_ID id;
    }
    bit(1) has_rare;
    if(has_rare) {
      attr_custom_rare rare;
    }
    bit(1) has_fill;
    if(has_fill) {
      attr_custom_paint fill;
    }
    bit(1) has_stroke;
    if(has_stroke) {
      attr_custom_paint stroke;
    }
    attr_editable editable;
    bit(1) has_rotate;
    if(has_rotate) {
      attr_floatList rotate;
    }
    bit(1) has_x;
    if(has_x) {
```

```
    attr_coordinateList x;
  }
  bit(1) has_y;
  if(has_y) {
    attr_coordinateList y;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_tspan {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_use {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  bit(1) externalResourcesRequired;
  bit(1) has_overflow;
  if(has_overflow) {
    attr_overflow overflow;
  }
  bit(1) has_x;
  if(has_x) {
    attr_custom_coordinate x;
  }
  bit(1) has_y;
  if(has_y) {
    attr_custom_coordinate y;
  }
  bit(1) has_href;
  if(has_href) {
    attr_custom_anyURI href;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_video {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_begin;
  if(has_begin) {
    attr_smil_times begin;
  }
  bit(1) has_dur;
  if(has_dur) {
```

```
    attr_time dur;
  }
  bit(1) externalResourcesRequired;
  bit(1) has_height;
  if(has_height) {
    attr_custom_coordinate height;
  }
  bit(1) has_overlay;
  if(has_overlay) {
    attr_overlay overlay;
  }
  bit(1) has_preserveAspectRatio;
  if(has_preserveAspectRatio) {
    attr_preserveAspectRatio preserveAspectRatio;
  }
  bit(1) has_repeatCount;
  if(has_repeatCount) {
    attr_repeatCount repeatCount;
  }
  bit(1) has_repeatDur;
  if(has_repeatDur) {
    attr_repeatDur repeatDur;
  }
  bit(1) has_restart;
  if (has_restart) {
    attr_restart restart;
  }
  bit(1) has_syncBehavior;
  if(has_syncBehavior) {
    attr_syncBehavior syncBehavior;
  }
  bit(1) has_syncTolerance;
  if(has_syncTolerance) {
    attr_syncTolerance syncTolerance;
  }
  bit(1) has_transformBehavior;
  if(has_transformBehavior) {
    attr_transformBehavior transformBehavior;
  }
  bit(1) has_type;
  if(has_type) {
    attr_custom_byteAlignedString type;
  }
  bit(1) has_width;
  if(has_width) {
    attr_custom_coordinate width;
  }
  bit(1) has_x;
  if(has_x) {
    attr_custom_coordinate x;
  }
  bit(1) has_y;
  if(has_y) {
    attr_custom_coordinate y;
  }
  bit(1) has_href;
  if(has_href) {
    attr_custom_anyURI href;
  }
  bit(1) has_clipBegin;
  if(has_clipBegin) {
    attr_time clipBegin;
  }
  bit(1) has_clipEnd;
  if(has_clipEnd) {
    attr_time clipEnd;
  }
  bit(1) has_fullscreen;
  if (has_fullscreen) {
    bit(1) fullscreen;
  }
  bit(1) has_syncReference;
  if(has_syncReference) {
    attr_custom_anyURI syncReference;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_listener {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
```

```
  bit(1) has_defaultAction;
  if(has_defaultAction) {
    attr_defaultAction defaultAction;
  }
  bit(1) has_event;
  if(has_event) {
    attr_custom_event event;
  }
  bit(1) has_handler;
  if(has_handler) {
    attr_custom_anyURI handler;
  }
  bit(1) has_observer;
  if(has_observer) {
    attr_custom_IDREF observer;
  }
  attr_phase phase;
  bit(1) has_propagate;
  if(has_propagate) {
    attr_propagate propagate;
  }
  bit(1) has_target;
  if(has_target) {
    attr_custom_IDREF target;
  }
  bit(1) enabled;
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_conditional {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_begin;
  if(has_begin) {
    attr_smil_times begin;
  }
  bit(1) externalResourcesRequired;
  bit(1) enabled;
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  updateListType_content child0;
  bit(1) opt_group;
  if(opt_group) {
    privateAttributeContainer privateAttributes;
  }
}
class updateListType_content {
        vluimsbf5 encoding-length;
        attr_custom_align encoding-align-before;
        vluimsbf5 occ0;
        for(int t=0;t<occ0+1;t++) {
                updates child0;
        }
        attr_custom_align encoding-align-after;
}
class updates {
  bit(4) ch4;
  switch(ch4){
    case 0:
      update_Add Add;
      break;
    case 1:
      update_Clean Clean;
      break;
    case 2:
      update_Delete Delete;
      break;
    case 3:
      update_Insert Insert;
      break;
    case 4:
      update_NewScene NewScene;
      break;
    case 5:
      update_RefreshScene RefreshScene;
      break;
    case 6:
      update_Replace Replace;
      break;
```

```
    case 7:
      update_Restore Restore;
      break;
    case 8:
      update_Save Save;
      break;
    case 9:
      update_SendEvent SendEvent;
      break;
    case 10:
      element_any ext;
      break;
    case 11:
      attr_custom_byteAlignedString textContent;
      break;
    default:
      break;
    }
}
class update_Add {
  bit(1) has_attributeName;
  if(has_attributeName) {
    attr_AttributeName attributeName;
  }
  bit(1) has_operandAttribute;
  if(has_operandAttribute) {
    attr_AttributeName operandAttribute;
  }
  bit(1) has_operandElementId;
  if(has_operandElementId) {
    attr_custom_IDREF operandElementId;
  }
  attr_custom_IDREF ref;
  bit(1) has_value;
  if(has_value) {
    attr_custom_updateValue value;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
}
class update_Clean {
  attr_custom_byteAlignedString groupID;
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
}
class update_Delete {
  bit(1) has_attributeName;
  if(has_attributeName) {
    attr_AttributeName attributeName;
  }
  bit(1) has_index;
  if(has_index) {
    attr_index index;
  }
  attr_custom_IDREF ref;
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
}
class update_Insert {
  bit(1) has_attributeName;
  if(has_attributeName) {
    attr_AttributeName attributeName;
  }
  bit(1) has_index;
  if(has_index) {
    attr_index index;
  }
  attr_custom_IDREF ref;
  bit(1) has_value;
  if(has_value) {
    attr_custom_updateValue value;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  bit(1) opt_group;
  if(opt_group) {
    updatable_elements child0;
  }
}
class updatable_elements {
  bit(1) ch4;
  switch(ch4){
```

```
    case 0:
      bit(6) ch6;
      switch(ch6){
        case 0:
          element_a a;
          break;
        case 1:
          element_animate animate;
          break;
        case 2:
          element_animate animateColor;
          break;
        case 3:
          element_animateMotion animateMotion;
          break;
        case 4:
          element_animateTransform animateTransform;
          break;
        case 5:
          element_audio audio;
          break;
        case 6:
          element_circle circle;
          break;
        case 7:
          element_defs defs;
          break;
        case 8:
          element_desc_metaData_title desc;
          break;
        case 9:
          element_ellipse ellipse;
          break;
        case 10:
          element_foreignObject foreignObject;
          break;
        case 11:
          element_g g;
          break;
        case 12:
          element_image image;
          break;
        case 13:
          element_line line;
          break;
        case 14:
          element_linearGradient linearGradient;
          break;
        case 15:
          element_desc_metaData_title metadata;
          break;
        case 16:
          element_mpath mpath;
          break;
        case 17:
          element_path path;
          break;
        case 18:
          element_polygon polygon;
          break;
        case 19:
          element_polygon polyline;
          break;
        case 20:
          element_radialGradient radialGradient;
          break;
        case 21:
          element_rect rect;
          break;
        case 22:
          element_script script;
          break;
        case 23:
          element_set set;
          break;
        case 24:
          element_stop stop;
          break;
        case 25:
          element_svg svg;
          break;
        case 26:
          element_switch switch;
          break;
        case 27:
          element_text text;
          break;
        case 28:
          element_desc_metaData_title title;
          break;
```

```
        case 29:
          element_tspan tspan;
          break;
        case 30:
          element_use use;
          break;
        case 31:
          element_video video;
          break;
        case 32:
          element_listener listener;
          break;
        }
      break;
    case 1:
      bit(3) ch61;
      switch(ch61){
        case 0:
          element_conditional conditional;
          break;
        case 1:
          element_cursorManager cursorManager;
          break;
        case 2:
          element_any extElement;
          break;
        case 3:
          privateElementContainer privateElement;
          break;
        case 4:
          element_rectClip rectClip;
          break;
        case 5:
          element_selector selector;
          break;
        case 6:
          element_simpleLayout simpleLayout;
          break;
        }
      break;
    }
}
class element_svg {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  bit(1) has_baseProfile;
  if(has_baseProfile) {
    attr_custom_byteAlignedString baseProfile;
  }
  bit(1) has_contentScriptType;
  if(has_contentScriptType) {
    attr_custom_byteAlignedString contentScriptType;
  }
  bit(1) externalResourcesRequired;
  attr_custom_valueWithUnits height;
  bit(1) has_playbackOrder;
  if(has_playbackOrder) {
    attr_playbackOrder playbackOrder;
  }
  bit(1) has_preserveAspectRatio;
  if(has_preserveAspectRatio) {
    attr_preserveAspectRatio preserveAspectRatio;
  }
  bit(1) has_snapshotTime;
  if(has_snapshotTime) {
    attr_time snapshotTime;
  }
  bit(1) has_syncBehaviorDefault;
  if(has_syncBehaviorDefault) {
    attr_syncBehaviorDefault syncBehaviorDefault;
  }
  bit(1) has_syncToleranceDefault;
  if(has_syncToleranceDefault) {
    attr_syncToleranceDefault syncToleranceDefault;
  }
  bit(1) has_timelineBegin;
```

```
  if(has_timelineBegin) {
    attr_timeLineBegin timelineBegin;
  }
  bit(1) has_version;
  if(has_version) {
    attr_custom_byteAlignedString version;
  }
  bit(1) has_viewBox;
  if(has_viewBox) {
    attr_viewBox viewBox;
  }
  attr_custom_valueWithUnits width;
  bit(1) has_zoomAndPan;
  if(has_zoomAndPan) {
    attr_zoomAndPan zoomAndPan;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_cursorManager {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_x;
  if(has_x) {
    attr_custom_coordinate x;
  }
  bit(1) has_y;
  if(has_y) {
    attr_custom_coordinate y;
  }
  bit(1) has_href;
  if(has_href) {
    attr_custom_anyURI href;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class privateElementContainer {
  bit(4) ch4;
  switch(ch4){
    case 0:
      privateAnyXMLElement anyXML;
      break;
    case 1:
      privateOpaqueElement opaque;
      break;
    case 2:
      element_any reserved;
      break;
    default:
      attr_custom_extension ext;
      break;
  }
}
class element_rectClip {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  bit(1) externalResourcesRequired;
  bit(1) has_size;
  if(has_size) {
    attr_point size;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
```

```
    attr_any any;
  }
  object_content child0;
}
class element_selector {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  bit(1) externalResourcesRequired;
  bit(1) has_choice;
  if(has_choice) {
    attr_choice choice;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class element_simpleLayout {
  bit(1) has_id;
  if(has_id) {
    attr_custom_ID id;
  }
  bit(1) has_rare;
  if(has_rare) {
    attr_custom_rare rare;
  }
  bit(1) has_fill;
  if(has_fill) {
    attr_custom_paint fill;
  }
  bit(1) has_stroke;
  if(has_stroke) {
    attr_custom_paint stroke;
  }
  bit(1) has_delta;
  if(has_delta) {
    attr_point delta;
  }
  bit(1) externalResourcesRequired;
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  object_content child0;
}
class update_NewScene {
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  element_svg child;
}
class update_RefreshScene {
  vluimsbf5 time;
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  element_svg child;
}
class update_Replace {
  bit(1) has_attributeName;
  if(has_attributeName) {
    attr_AttributeName attributeName;
  }
  bit(1) has_index;
  if(has_index) {
    attr_index index;
  }
  bit(1) has_operandAttribute;
  if(has_operandAttribute) {
    attr_AttributeName operandAttribute;
  }
  bit(1) has_operandElementId;
  if(has_operandElementId) {
```

```
    attr_custom_IDREF operandElementId;
  }
  attr_custom_IDREF ref;
  bit(1) has_value;
  if(has_value) {
    attr_custom_updateValue value;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
  bit(1) opt_group;
  if(opt_group) {
    vluimsbf5 occ1;
    for(int t=0;t<occ1;t++) {
      updatable_elements child0[[t]];
    }
  }
}
class update_Restore {
  attr_custom_byteAlignedString groupID;
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
}
class update_Save {
  attr_custom_ElementAttributeList elementAttributeList;
  attr_custom_byteAlignedString groupID;
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
}
class update_SendEvent {
  attr_custom_event event;
  bit(1) has_intvalue;
  if(has_intvalue) {
    signedInt intvalue;
  }
  bit(1) has_pointvalue;
  if(has_pointvalue) {
    attr_point pointvalue;
  }
  attr_custom_IDREF ref;
  bit(1) has_stringvalue;
  if(has_stringvalue) {
    attr_custom_byteAlignedString stringvalue;
  }
  bit(1) has_attr_any;
  if(has_attr_any) {
    attr_any any;
  }
}
//*************************************************************************************************
// start specific classes
//*************************************************************************************************

class LASeRUnit {
  LASeRUnitHeader h;
  initialisations c;
  vluimsbf5 occ1;
  for(int t=0;t<occ1+1;t++) {
    updates child0;
  }
  bit(1) opt_group;
  if(opt_group) {
    attr_custom_extension ext;
  }
}
class LASeRUnitHeader {
  bit(1) resetEncodingContext;
  bit(1) opt_group;
  if(opt_group) {
    attr_custom_extension ext;
  }
}
class initialisations {
  colorInitialisation c;
  fontInitialisation f;
  privateDataIdentifierInitialisation p;
  anyXMLInitialisation a;
  extendedInitialisation e;
}


//*************************************************************************************************
// extensions
//*************************************************************************************************
```

```
//for elements and updates
class element_any {
  uint(extensionIDBits) reserved;
  vluimsbf5 len; //length in bits
  bit[len] toSkip;
}

//for attributes
class attr_any {
  do {
    uint(extensionIDBits) reserved;
    vluimsbf5 len; //length in bits
    bit[len] toSkip;
    bit(1) hasNextExtension;
  } while (hasNextExtension);
}


//*************************************************************************************************
// LASeRHeader
//*************************************************************************************************

class LASeRHeader {
  uint(8) profile;
  uint(8) level;
  bit(3) reserved;
  bit(2) pointsCodec;
  bit(4) pathComponents;
  bit(1) useFullRequestHost;
  bit(1) hasTimeResolution;
  if (hasTimeResolution) {
    uint(16) timeResolution;
  }
  bit(4) colorComponentBits_minus_1;
  colorComponentBits = colorComponentBits_minus_1 + 1;
  bit(4) resolution;
  bit(5) coordBits;
  bit(4) scaleBits_minus_coordBits;
  bit(1) newSceneIndicator;
  bit(3) reserved;
  // extensionIDBits defines the number of bits of extension tags
  bit(4) extensionIDBits;
  bit(1) hasExtensionDescriptor;
  if (hasExtensionDescriptor) {
    vluimsbf5 len;
    byte[len] extensionDescriptor; //extensionDescriptor can be used by a BiM decoder has specified in Annex A.
  }
  bit(1) hasExtension;
  if (hasExtension) {
    attr_custom_extension ext;
  }
}

//*************************************************************************************************
// Initialisation codecs
//*************************************************************************************************

int colorIndex = -1;

class colorInitialisation {
  bit(1) hasColors;
  if (hasColors) {
    // a color table in front of each AU
    vluimsbf5 nbColors;
    for (int i = 0; i < nbColors; i++) {
      colorIndex = colorIndex + 1;
      uint(colorComponentBits) red[[colorIndex]];
      uint(colorComponentBits) green[[colorIndex]];
      uint(colorComponentBits) blue[[colorIndex]];
    }
    colorIndexBits = log2sup(colorIndex);
  }
}
int fontIndex = -1;

class fontInitialisation {
  bit(1) hasFonts;
  if (hasFonts) {
    // a font table in front of each AU
    vluimsbf5 nbFonts;
    for (int i = 0; i < nbFonts; i++) {
      fontIndex = fontIndex + 1;
      attr_custom_byteAlignedString font[[fontIndex]];
    }
    fontIndexBits = log2sup(fontIndex);
  }
}

int privateDataIdentifierIndex = -1;
```

```
class privateDataIdentifierInitialisation {
  bit(1) hasPrivateDataIdentifiers;
  if (hasPrivateDataIdentifiers) {
    // a privateDataIdentifiertable in front of each AU
    vluimsbf5 nbPrivateDataIdentifiers;
    for (int i = 0; i < nbPrivateDataIdentifiers; i++) {
      privateDataIdentifierIndex = privateDataIdentifierIndex + 1;
      // the purpose of these strings is to ensure non collision between different private data
      // examples are URNs, uuids, ...
      attr_custom_byteAlignedString privateDataIdentifier[[privateDataIdentifierIndex]];
    }
    privateDataIdentifierIndexBits = log2sup(privateDataIdentifierIndex);
  }
}

int tagIndex = -1;

class anyXMLInitialisation {
  bit(1) hasTags;
  if (hasTags) {
    // a tag table in front of each AU
    vluimsbf5 nbTags;
    for (int i = 0; i < nbTags; i++) {
      if (i == 0) {
        // tag 0 for use for priv. attrs on LASeR elements
        bit(1) hasAttrs;
        if (hasAttrs) {
          // the first bin is reserved for private attributes of LASeR elements
          // and to attributes with a privateDataIdentifier different from their parent element
          vluimsbf5 nbAttrNames[[0]];
          for (int t = 0; t < nbAttrNames[[0]]; t++) {
            uint(privateDataIdentifierIndexBits) privateDataIdentifierIndex[[0]][[t]];
            attr_custom_byteAlignedString attrName[[0]][[t]];
          }
        }
      } else {
        tagIndex = tagIndex + 1;
        uint(privateDataIdentifierIndexBits) privateDataIdentifierIndex[[i]];
        attr_custom_byteAlignedString tag[[i]];
        bit(1) hasAttrs;
        if (hasAttrs) {
          // each private element tag has a bin for private attributes
          vluimsbf5 nbAttrNames[[tagIndex]];
          for (int t = 0; t < nbAttrNames[[tagIndex]]; t++) {
            attr_custom_byteAlignedString attrName[[tagIndex]][[t]];
          }
        }
      }
    }
    tagIndexBits = log2sup(tagIndex);
  }
}

class extendedInitialisation {
  // stringIDTable: external string ID references
  vluimsbf5 countG;
  for (int i = 0; i < countG; i++) {
    vluimsbf5 binaryIdForThisStringID[[i]];
    attr_custom_byteAlignedString stringID[[i]];
  }
  bit(1) hasExtension;
  if (hasExtension) {
    vluimsbf5 len;
    bit[len] toSkip;
  }
}
```

12.2.2 Generic Data Types

```
class object_content {
  bit(1) opt_group;
  if (opt_group) {
    privateAttributeContainer privateAttributes;
  }
  bit(1) opt_group1;
  if (opt_group1) {
    vluimsbf5 occ1;
    for(int t=0;t<occ1;t++) {
      elements child0[[t]];
    }
  }
}
class attr_AttributeName {
  bit(1) choice;
  switch(choice) {
    case 0:
      //  Enumeration:  a.target{0}  accumulate{1}  additive{2}  audio-level{3}  bandwidth{4}  begin{5}  calcMode{6}
children{7}  choice{8}  clipBegin{9}  clipEnd{10}  color{11}  color-rendering{12}  cx{13}  cy{14}  d{15}  delta{16}
```

```
display{17} display-align{18} dur{19} editable{20} enabled{21} end{22} event{23} externalResourcesRequired{24}
fill{25} fill-opacity{26} fill-rule{27} focusable{28} font-family{29} font-size{30} font-style{31} font-variant{32}
font-weight{33} fullscreen{34} gradientUnits{35} handler{36} height{37} image-rendering{38} keyPoints{39}
keySplines{40} keyTimes{41} line-increment{42} listener.target{43} mediaCharacterEncoding{44}
mediaContentEncodings{45} mediaSize{46} mediaTime{47} nav-down{48} nav-down-left{49} nav-down-right{50} nav-left{51}
nav-next{52} nav-prev{53} nav-right{54} nav-up{55} nav-up-left{56} nav-up-right{57} observer{58} offset{59}
opacity{60} overflow{61} overlay{62} path{63} pathLength{64} pointer-events{65} points{66} preserveAspectRatio{67}
r{68} repeatCount{69} repeatDur{70} requiredExtensions{71} requiredFeatures{72} requiredFormats{73} restart{74}
rotate{75} rotation{76} rx{77} ry{78} scale{79} shape-rendering{80} size{81} solid-color{82} solid-opacity{83} stop-
color{84} stop-opacity{85} stroke{86} stroke-dasharray{87} stroke-dashoffset{88} stroke-linecap{89} stroke-
linejoin{90} stroke-miterlimit{91} stroke-opacity{92} stroke-width{93} svg.height{94} svg.width{95} syncBehavior{96}
syncBehaviorDefault{97} syncReference{98} syncTolerance{99} syncToleranceDefault{100} systemLanguage{101} text-
align{102} text-anchor{103} text-decoration{104} text-display{105} text-rendering{106} textContent{107}
transform{108} transformBehavior{109} translation{110} vector-effect{111} viewBox{112} viewport-fill{113} viewport-
fill-opacity{114} visibility{115} width{116} x{117} x1{118} x2{119} xlink:actuate{120} xlink:arcrole{121}
xlink:href{122} xlink:role{123} xlink:show{124} xlink:title{125} xlink:type{126} xml:base{127} xml:lang{128} y{129}
y1{130} y2{131} zoomAndPan{132}
      bit(8) AttributeName;
      break;
  case 1:
    int max=+2;
    for (int t=0;t<max;t++) {
    vluimsbf5 item[[t]];
    }
    break;
  }
}
class attr_accumulate {
    // Enumeration: none{0} sum{1}
    bit(1) accumulate;
}
class attr_additive {
    // Enumeration: replace{0} sum{1}
    bit(1) additive;
}
class attr_calcMode {
    // Enumeration: discrete{0} linear{1} paced{2} spline{3}
    bit(2) calcMode;
}
class attr_attributeType {
  // Enumeration: CSS{0} XML{1} auto{2}
  bit(2) attributeType;
}
class attr_smil_times {
   bit(1) choice;
   switch(choice) {
   case 0:
       vluimsbf5 max;
       for(int t=0;t<max;t++) {
      custom_smil_time item[[t]];
       }
       break;
   case 1:
       // Enumeration: indefinite {0}
       break;
   }
}
class attr_time {
  bit(1) choice;
  switch(choice) {
    case 0:
      signedInt int0;
      break;
    case 1:
      // Enumeration: auto{0} indefinite{1} media{2} none{3}
    bit(2) time;
    break;
    default:
      break;
  }
}
class signedInt {
  bit(1) sign; // 1 is negative
  vluimsbf5 value;
}
class attr_animFill {
    // Enumeration: freeze{0} remove{1}
    bit(1) animFill;
}
class attr_repeatCount {
    bit(1) choice;
    switch(choice) {
      case 0:
        attr_custom_fixed_16_8 fixed16_8Type0;
        break;
      case 1:
        // Enumeration: indefinite{0}
        break;
      default:
        break;
```

```
      }
}
class attr_repeatDur {
    bit(1) choice;
    switch(choice) {
      case 0:
        vluimsbf5 dur;
        break;
      case 1:
        // Enumeration: indefinite{0}
        break;
      default:
        break;
      }
}
class attr_restart {
    // Enumeration: always{0} never{1} whenNotActive{2}
    bit(2) restart;
}
class attr_floatList {
  vluimsbf5 max;
  for (int t=0;t<max;t++) {
    attr_custom_fixed_16_8 item[[t]];
  }
}
class attr_rotate {
    bit(1) choice;
    switch(choice) {
      case 0:
        attr_custom_fixed_16_8 fixed16_8Type0;
        break;
      case 1:
          // Enumeration: auto{0} auto-reverse{1}
          bit(1) rotate;
        break;
      default:
        break;
      }
}
class attr_rotscatra {
    // Enumeration: rotate{0} scale{1} skewX{2} skewY{3} translate{4}
    bit(3) rotscatra;
}
class attr_syncBehavior {
    // Enumeration: canSlip{0} default{1} independent{2} locked{3}
    bit(2) syncBehavior;
}
class attr_syncTolerance {
    bit(1) choice;
    switch(choice) {
      case 0:
        vluimsbf5 vluimsbf50;
        break;
      case 1:
          // Enumeration: default{0}
        break;
      }
}
class attr_preserveAspectRatio {
    bit(1) choice;
    switch(choice) {
      case 0:
          bit(1) choice;
          switch(choice) {
            case 0:
              //  Enumeration:  none{0}  xMaxYMax{1}  xMaxYMid{2}  xMaxYMin{3}  xMidYMax{4}  xMidYMid{5}  xMidYMin{6}
xMinYMax{7} xMinYMid{8} xMinYMin{9}
              bit(4) preserveAspectRatio;
              break;
            case 1:
              // Enumeration: _reserved{0} defer xMaxYMax{1} defer xMaxYMid{2} defer xMaxYMin{3} defer xMidYMax{4}
defer xMidYMid{5} defer xMidYMin{6} defer xMinYMax{7} defer xMinYMid{8} defer xMinYMin{9}
              bit(4) preserveAspectRatio;
              break;
            }
        break;
      case 1:
          // Enumeration: reserved{0}
          bit(5) preserveAspectRatio;
        break;
      }
}
class attr_transformBehavior {
    // Enumeration: geometric{0} pinned{1} pinned_180{2} pinned_270{3} pinned_90{4}
    bit(4) transformBehavior;
}
class attr_gradientUnits {
    // Enumeration: objectBoundingBox{0} userSpaceOnUse{1}
    bit(1) gradientUnits;
}
```

```
class attr_editable {
    // Enumeration: none{0} simple{1}
    bit(1) editable;
}
class objectSame_content {
  bit(1) opt_group;
  if (opt_group) {
    vluimsbf5 occ0;
    for(int t=0;t<occ0;t++) {
      elements child0[[t]];
    }
  }
}
class attr_script {
    bit(1) choice;
    switch(choice) {
      case 0:
        attr_custom_byteAlignedString string0;
        break;
      case 1:
          // Enumeration: application/ecmascript{0} application/jar-archive{1}
          bit(1) script;
        break;
      }
}
class attr_overflow {
    // Enumeration: visible{0}
    bit(2) overflow;
}
class attr_overlay {
    bit(1) choice;
    switch(choice) {
      case 0:
        attr_custom_extension overlayExType0;
        break;
      case 1:
          // Enumeration: none{0} top{1}
          bit(1) overlay;
        break;
      default:
        break;
      }
}
class attr_defaultAction {
    // Enumeration: cancel{0} perform{1}
    bit(1) defaultAction;
}
class attr_phase {
    // Enumeration: default{0}
    bit(1) phase;
}
class attr_propagate {
    // Enumeration: continue{0} stop{1}
    bit(1) propagate;
}
class attr_index {
  vluimsbf5 value;
}
class attr_playbackOrder {
    // Enumeration: all{0} forwardOnly{1}
    bit(1) playbackOrder;
}
class attr_syncBehaviorDefault {
    // Enumeration: canSlip{0} independent{1} inherit{2} locked{3}
    bit(2) syncBehaviorDefault;
}
class attr_syncToleranceDefault {
    bit(1) choice;
    switch(choice) {
      case 0:
        vluimsbf5 vluimsbf50;
        break;
      case 1:
          // Enumeration: inherit{0}
        break;
      default:
        break;
      }
}
class attr_timeLineBegin {
    // Enumeration: onLoad{0} onStart{1}
    bit(1) timeLineBegin;
}
class attr_viewBox {
  int max=+4;
  for (int t=0;t<max;t++) {
    attr_custom_fixed_16_8 item[[t]];
  }
}
class attr_zoomAndPan {
```

```
    // Enumeration: disable{0} magnify{1}
    bit(1) zoomAndPan;
}
class attr_point {
  int max=+2;
  for (int t=0;t<max;t++) {
    attr_custom_coordinate item[[t]];
  }
}
class attr_choice {
    bit(1) choice;
    switch(choice) {
      case 0:
        bit(8) value;
        break;
      case 1:
          // Enumeration: all{0} none{1}
          bit(1) choice;
        break;
      }
}
class attr_coordinateList {
  vluimsbf5 len;
  for (int t = 0; t < len; t++) {
    attr_custom_coordinate coord[[t]];
  }
}
```

Replace 12.2.3.1.1 (ID Syntax) with:

```
class attr_custom_ID {
    vluimsbf5 ID;
    bit(1) reserved;
    if (reserved) {
        vluimsbf5 len;
        bit[len] reserved;
    }
}
```

Replace 12.2.3.1.2 (ID Semantics) with:

This class allocates a number for an id.

Replace 12.2.3.2.1 (IDREf Syntax) with:

```
class attr_custom_IDREF {
    vluimsbf5 href;
    bit(1) reserved;
    if (reserved) {
        vluimsbf5 len;
        bit[len] reserved;
    }
}
```

Replace 12.2.3.3.1 (Any URI Syntax) with:

```
class attr_custom_anyURI {
    bit(1) hasUri;
    if (hasUri) {
        attr_custom_byteAlignedString uri;
        bit(1) hasData; // for a data URL, the actual data part is sent below, the header is sent in the uri field
        if (hasData) {
            vluimsbf5 len;
            byte[len] data;
        }
    }
    bit(1) hasID;
    if (hasID) {
        attr_custom_IDREF idref;
    }
    bit(1) hasStreamID;
    if (hasStreamID) {
        attr_custom_IDREF ref;
    }
}
```

Replace 12.2.3.4.1 (Color Syntax) with:

```
class attr_custom_paint {
  bit(1) hasIndex;
  if (hasIndex) {
    uint(colorIndexBits) color0;
  } else {
      bit(2) ch2;
      switch(ch2) {
        case 0: // enum
         //Enumeration: inherit{0} currentColor{1} none{2}
```

```
        bit(2) color;
          break;
        case 1: // URI
          attr_custom_anyURI uri;
          break;
        case 2: // System Paint Server
          attr_custom_byteAlignedString serverName;
          break;
        case 3:
          attr_custom_extension colorExType0; // extensibility
          break;
      }
  }
}
```

Replace 12.2.3.5.1 (Matrix Syntax) with:

```
class custom_matrix {
    bit(1) isNotMatrix;
    if (isNotMatrix) {
      bit(1) isRef; // modification for the encoding of ref(svg[,x,y])
      if (isRef) {
        bit(1) hasXY;
        if (hasXY) {
          attr_custom_fixed_16_8 valueX;
          attr_custom_fixed_16_8 valueY;
        }
      } else {
        attr_custom_extension ext;
      }
    } else {
      bit(1) xx_yy_present;
      if (xx_yy_present) {
          uint(coordBits+scaleBits_minus_coordBits) xx;
          uint(coordBits+scaleBits_minus_coordBits) yy;
      }
      bit(1) xy_yx_present;
      if (xy_yx_present) {
          uint(coordBits+scaleBits_minus_coordBits) xy;
          uint(coordBits+scaleBits_minus_coordBits) yx;
      }
      bit(1) xz_yz_present;
      if (xz_yz_present) {
          uint(coordBits+scaleBits_minus_coordBits) xz;
          uint(coordBits+scaleBits_minus_coordBits) yz;
      }
    }
}
```

Replace 12.2.3.7.1 (Path Syntax) with:

```
class attr_custom_path {
    attr_custom_pointSequence seq;
    vluimsbf5 nbOfTypes;
    for (int i = 0; i < nbOfTypes; i++) {
        // Enumeration: "pathSegmentTypes" C{0} H{1} L{2} M{3} Q{4} S{5} T{6} V{7} Z{8} c{9} h{10} l{11} m{12} q{13}
s{14} t{15} v{16} z{17}
        uint(5) type[[i]];
    }
}
```

Replace 12.2.3.7.2 (Path Semantics) with:

The class `attr_custom_path` decodes a path value.

The decoding of a path value (e.g. the d attribute of a path element) is achieved by decoding a sequence of points and a list of types. The sequence of point is decoded as specified in 13.2.3.8. The decoded point coordinates are absolute values. When decoding the list of types, an implicit MoveTo shall be inserted before the first decoded type.

A decoder can use the decoded coordinate values directly for rendering by changing relative drawing types (a.k.a drawing instructions) to their absolute counterpart (e.g. changing ‘c’ to ‘C’). A decoder may reconstruct an SVG path, exactly as it was in the original document, by walking in the list of drawing types and retrieving the appropriate number of coordinates according to the drawing type. For relative types (e.g. ‘c’, ‘l’), the associated coordinate values may be restored to their relative values using the previous coordinate values.

Replace 12.2.3.8.1 (PointSequence Syntax) with:

```
class attr_custom_pointSequence {
    vluimsbf5 nbPoints;
    uint(1) flag;
    if (flag == 0) {
        if (nbPoints < 3) {
            uint(5) bits;
            for (int i = 0; i < nbPoints; i++) {
                uint(bits) x[[i]];
                uint(bits) y[[i]];
            }
        } else {
            uint(5) bits;
            uint(bits) x[0];
            uint(bits) y[0];
            uint(5) bitsx;
            uint(5) bitsy;
            for (int i = 1; i < nbPoints; i++) {
                uint(bitsx) dx;
                uint(bitsy) dy;
                x[i] = dx + x[i-1];
                y[i] = dy + y[i-1];
            }
        }
    } else {
      if (pointsCodec == 0) { // pointsCodec is a LASeRHeader attribute
        uint(4) kvalue;
        uint(5) bits;
        uint(bits) x[0];
        uint(bits) y[0];
        int XMvalue,YMvalue = 0;
        int CodeNum = 0;
        int Diff =0;
        for(int i=1; i < nbPoints; i++) {
            // to calculate X point
            do {
                bit(1) bitX;
                XMvalue ++;
            } while (bitX == 0);
        const bit(1) endX = 1;
            uint(XMvalue+kvalue) INFO_dx;
            CodeNum = GetCodeNum(kvalue, XMvalue, INFO_dx);
            Diff = GetDiff(CodeNum);
            x[i] = x[i-1] + Diff;
            // to calculate Y point
            do {
                bit(1) bitY;
                YMvalue ++;
            } while (bitY == 0);
        const bit(1) endY = 1;
            uint(YMvalue+kvalue) INFO_dy;
            CodeNum = GetCodeNum(kvalue, YMvalue, INFO_dy);
            Diff = GetDiff(CodeNum);
            y[i] = y[i-1] + Diff;
        }
    } else {
        attr_custom_extension ext;
    }
  }
}

uint GetDiff(int codeNum){
      int diff;
      if (codeNum == 0) {
          diff = 0;
          return diff;
      } else {
            if ((codeNum%2) == 0 ) {
                diff = -codeNum/2;
                return diff;
            } else {
                diff = (codeNum+1)/2;
                return diff;
            }
      }
}

uint GetCodeNum(int k, int Mvalue, int INFO){
    return 2^(k+Mvalue) + INFO - 2^k ;
}
```

Replace 12.2.3.9.1 (ValueWithUnits Syntax) with:

```
class attr_custom_valueWithUnits {
    uint(32) value; // float represented as fixed point with 8 bits mantissa
    uint(3) units; // 0 no unit or px, 1 'in', 2 'cm', 3 'mm', 4 'pt', 5 'pc', 6 '%'
}
```