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**ISO/IEC JTC 1/SC 29/WG 03 MPEG SYSTEMS**

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| **Title** | **WD of ISO/IEC 23009-1 5th edition AMD2 EDRAP streaming and other extensions** |
| **Source** | **WG 03, MPEG Systems** |
| **Status** | **Approved** |
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# Change 1: EDRAP Streaming

*In clause 2, add the following reference:*

*ISO/IEC 14496‑12:2021 AMD1[[1]](#footnote-1), Information technology — Coding of audio-visual objects — Part 12: ISO base media file format, AMD 1 Improved brand documentation and other improvements [Ed. Note (YK): The latest draft text of this amendment as of Jan. 2022 is in WG 03 output document N0400.]*

*In subclause 3.2, add the following abbreviations:*

|  |  |
| --- | --- |
| EDRAP | extended dependent random access point |
| ESR | external stream Representation |
| MSR | main stream Representation |

*Add subclause 5.8.5.15 as follows:*

***5.8.5.15 MSR and ESR descriptors***

**5.8.5.15.1 General**

An Adaptation Set may have an **EssentialProperty** descriptor with @schemeIdUri equal to urn:mpeg:dash:msr:2021. This descriptor is referred to as the MSR descriptor. The presence of an MSR descriptor in an Adaptation Set indicates that each Representation in the Adaptation Set is an MSR, which carries a main stream track (MST) specified in ISO/IEC 14496 12:2021 AMD1.

An Adaptation Set may have an **EssentialProperty** descriptor with @schemeIdUri equal to urn:mpeg:dash:esr:2021. This descriptor is referred to as the ESR descriptor. The presence of an ESR descriptor in an Adaptation Set indicates that each Representation in the Adaptation Set is an ESR, which carries an external stream track (EST) specified in ISO/IEC 14496 12:2021 AMD1. An ESR shall only be consumed or played back together with its associated MSR.

Each ESR shall be associated with an MSR through the Representation-level attributes @associationId and @associationType in the MSR as follows: the @id of the associated ESR shall be referred to by a value contained in the attribute @associationId for which the corresponding value in the attribute @associationType is equal to 'aest'. Each MSR shall have an associated ESR.

For an MSR and an ESR associated with each other, the following applies:

* For each media sample with a particular presentation time in the ESR, there shall be a corresponding media sample with the same presentation time in the MSR.
* Each media sample in the MSR that has a corresponding ESR media sample is referred to as an EDRAP sample.
* The first byte position of each EDRAP sample in the MSR is the ISAU of a SAP, which enables playback of the media stream in the MSR provided that the corresponding ESR media sample is provided to the media decoder immediately before the EDRAP sample and the subsequent samples in the MSR.
* Each EDRAP sample in the MSR shall be the first sample in a Segment (i.e., each EDRAP sample shall start a Segment).
* For each Segment in the MSR that starts with an EDRAP sample, there shall be a Segment in the ESR having the same Segment start time as the MSR Segment.
* The concatenation of any Segment in the ESR and the corresponding Segment and all subsequent Segments in the MSR shall result in a conforming bitstream.
* For each MSR Segment that does not start with an EDRAP sample, there shall be no corresponding Segment in the ESR having the same Segment start time as the MSR Segment.

**5.8.5.15.2 Example content preparation and client operations (informative)**

Below are example content preparation and client operations based on MSRs and their associated ESRs.

An example of content preparation operations is as follows:

1. A video content is encoded into one or more representations, each is of a particular spatial resolution, temporal resolution, and quality.
2. Each representation of the video content is represented by a pair of MSR and ESR associated with each other.
3. The MSRs of the video content are included in one Adaptation Set. The ESRs of the video content are included in another Adaptation Set.

An example of client operations is as follows:

1. A client gets the MPD of the Media Presentation, parses the MPD, selects an MSR, and determines the starting presentation time from which the content is to be consumed.
2. The client requests Segments of the MSR, starting from the Segment containing the sample having presentation time equal to (or close enough to) the determined starting presentation time.
   1. If the first sample in the starting Segment is an EDRAP sample, the corresponding Segment (having the same Segment start time) in the associated ESR is also requested, preferably before requesting of the MSR Segments. Otherwise, no Segment of the associated ESR is requested.
3. When switching to a different MSR, the client requests Segments of the switch-to MSR, starting from the first Segment having Segment start time greater than that of the last requested Segment of the switch-from MSR.
   1. If the first sample in the starting Segment in the switch-to MSR is an EDRAP sample, the corresponding Segment in the associated ESR is also requested, preferably before requesting of the MSR Segments. Otherwise, no Segment of the associated ESR is requested.
4. When continuously operating at the same MSR (after decoding of the starting Segment after a seeking or stream switching operation), no Segment of the associated ESR needs to be requested, including when requesting any subsequent Segment starting with an EDRAP sample.

# Change 2: Adding dispatch mode and status to Event

*Replace Table 38s and 39 with the following tables:*

Table 38 — Event Stream Semantics

| **Element or Attribute Name** | | | **Use** | **Description** |
| --- | --- | --- | --- | --- |
|  | EventStream | |  | specifies event Stream |
|  |  | @xlink:href | O | specifies a reference to an external EventStream element |
|  |  | @xlink:actuate | OD  default: onRequest | specifies the processing instructions, which can be either "onLoad" or "onRequest".  This attribute shall not be present if the @xlink:href attribute is not present. |
|  |  | @schemeIdUri | M | identifies the message scheme. The string may use URN or URL syntax. When a URL is used, it is recommended to also contain a month-date in the form mmyyyy; the assignment of the URL must have been authorized by the owner of the domain name in that URL on or very close to that date. A URL may resolve to an Internet location, and a location that does resolve may store a specification of the message scheme. |
|  |  | @value | O | specifies the value for the event stream element. The value space and semantics must be defined by the owners of the scheme identified in the @schemeIdUri attribute. |
|  |  | @dispatchMode | O  Default:  on-receive | specifies the dispatch mode for this event scheme with the following values:   * on-receive: dispatch the event to application as soon as it is parsed by the DASH client. * on-start: dispatch the event to application at the event’s start time. |
|  |  | @timescale | O | specifies the timescale in units per seconds to be used for the derivation of different real-time duration values in the Event elements.  If not present on any level, it shall be set to 1. |
|  |  | @presentationTimeOffset | OD  Default: 0 | specifies the presentation time offset of this Event Stream that aligns with the start of the Period. Any Event contained in this Event Stream is mapped to the Period timeline by using the Event presentation time subtracted by the value of the presentation time offset.  This adjustment shall not be applied to Inband event message streams..  The value of the presentation time offset in seconds is the division of the value of this attribute and the value of the @timescale attribute. |
|  |  | Event | 0 ... N | specifies one event. For details see Table 39.  Events in Event Streams shall be ordered such that their presentation time is non-decreasing. |
| **Key**  For attributes: M=mandatory, O=optional, OD=optional with default value, CM=conditionally mandatory  For elements: <minOccurs>...<maxOccurs> (N=unbounded)  Elements are bold; attributes are non-bold and preceded with an @. | | | | |

Table 39 — Event Semantics

| **Element or Attribute Name** | | | | | **Use** | **Description** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Event | |  | specifies an Event and contains the message of the event. The content of this element depends on the event scheme. The contents shall be either:   * A string, optionally encoded as specified by @contentEncoding * XML content using elements external to the MPD namespace   For new event schemes string content should be used, making use of Base 64 encoding if needed.  NOTE The schema allows “mixed” content within this element however only string data or XML elements are permitted by the above options, not a combination. |
|  |  |  |  | @presentationTime | OD default: 0 | specifies the presentation time of the event relative to the start of the Period taking into account the @presentationTimeOffset of the Event Stream, if present.  The value of the presentation time in seconds is the division of the value of this attribute and the value of the @timescale attribute.  If not present, the value of the presentation time is 0. |
|  |  |  |  | @duration | O | specifies the presentation duration of the Event.  The value of the duration in seconds is the division of the value of this attribute and the value of the  @timescale attribute.  The interpretation of the value of this attribute is defined by the scheme owner.  If not present, the value of the duration is unknown. |
|  |  |  |  | @id | O | specifies an identifier for this instance of the event. Events with equivalent content and attribute values in the Event element shall have the same value for this attribute.  The scope of the @id for each Event is with the same @schemeIdURI and @value pair. |
|  |  |  |  | @status | O  default: none | specifies the status of event:   * none: no specific status * update: the event is an update of another event with identical values of @scheme\_id\_uri, @value, and @id fields |
|  |  |  |  | @contentEncoding | O | specifies whether the information in the body and the information in the @messageData is encoded.  If present, the following value is possible:   * base64 the content is encoded as described in IETF RFC 4648 prior to adding it to the field.   If this attribute is present, the DASH Client is expected to decode the message data and only provide the decoded message to the application. |
|  |  |  |  | @messageData | O | specifies the value for the event stream element. The value space and semantics must be defined by the owners of the scheme identified in the @schemeIdUri attribute.  NOTE the use of the message data is discouraged by content authors, it is only maintained for the purpose of backward-compatibility. Including the message in the Event element is recommended in preference to using this attribute. This attribute is expected to be deprecated in the future editions of this document. |
| **Key**  For attributes: M=mandatory, O=optional, OD=optional with default value, CM=conditionally mandatory  For elements: <minOccurs>...<maxOccurs> (N=unbounded)  Elements are bold; attributes are non-bold and preceded with an @. | | | | | | |

*Replace 5.10 with the following:*

<xs:complexType name="EventStreamType">

<xs:annotation>

<xs:documentation xml:lang="en">

**Event Stream**

</xs:documentation>

</xs:annotation>

<xs:sequence>

<xs:element name="Event" type="EventType" minOccurs="0" maxOccurs="unbounded"/>

<xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

</xs:sequence>

<xs:attribute ref="xlink:href"/>

<xs:attribute ref="xlink:actuate" default="onRequest"/>

<xs:attribute ref="xlink:type" fixed="simple"/>

<xs:attribute ref="xlink:show" fixed="embed"/>

<xs:attribute name="schemeIdUri" type="xs:anyURI" use="required"/>

<xs:attribute name="value" type="xs:string"/>

<xs:attribute name="dispatchMode" type="DispatchModeType"/>

<xs:attribute name="timescale" type="xs:unsignedInt"/>

<xs:attribute name="presentationTimeOffset" type="xs:unsignedLong" default="0"/>

</xs:complexType>

<xs:complexType name="EventType" mixed="true">

<xs:annotation>

<xs:documentation xml:lang="en">

**Event**

</xs:documentation>

</xs:annotation>

<xs:sequence>

<xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

</xs:sequence>

<xs:attribute name="presentationTime" type="xs:unsignedLong" default="0"/>

<xs:attribute name="duration" type="xs:unsignedLong"/>

<xs:attribute name="id" type="xs:unsignedInt"/>

<xs:attribute name="status" type="xs:StatusType"/>

<xs:attribute name="contentEncoding" type="ContentEncodingType"/>

<xs:attribute name="messageData" type="xs:string">

<xs:annotation>

<xs:documentation xml:lang="en">

**Deprecated in favor of carrying the message information in the**

**value space of the event**

</xs:documentation>

</xs:annotation>

</xs:attribute>

<xs:anyAttribute namespace="##other" processContents="lax"/>

</xs:complexType>

<xs:simpleType name="DispatchModeType">

<xs:annotation>

<xs:documentation xml:lang="en">

**Dispatch Mode**

</xs:documentation>

</xs:annotation>

<xs:restriction base="xs:string">

<xs:enumeration value="on-receive"/>

<xs:enumeration value="on-start"/>

</xs:restriction>

</xs:simpleType>

<xs:simpleType name="StatusType">

<xs:annotation>

<xs:documentation xml:lang="en">

**Event Status**

</xs:documentation>

</xs:annotation>

<xs:restriction base="xs:string">

<xs:enumeration value="none"/>

<xs:enumeration value="update"/>

</xs:restriction>

</xs:simpleType>

<xs:simpleType name="ContentEncodingType">

<xs:annotation>

<xs:documentation xml:lang="en">

**Event Coding**

</xs:documentation>

</xs:annotation>

<xs:restriction base="xs:string">

<xs:enumeration value="base64"/>

</xs:restriction>

</xs:simpleType>

*Replace 5.10.3.3.3 with the following:*

##### Syntax

aligned(8) class DASHEventMessageBox extends FullBox('emsg', version, flags){

if (version==0) {

string scheme\_id\_uri;

string value;

unsigned int(32) timescale;

unsigned int(32) presentation\_time\_delta;

unsigned int(32) event\_duration;

unsigned int(32) id;

} else if (version==1) {

unsigned int(32) timescale;

unsigned int(64) presentation\_time;

unsigned int(32) event\_duration;

unsigned int(32) id;

string scheme\_id\_uri;

string value;

}

unsigned int(8) message\_data[];

}

*Replace 5.10.3.3.4 with the following:*

— scheme\_id\_uri: is a null-terminated ('C') string in UTF-8 characters that identifies the message scheme. The semantics and syntax of the message\_data[] are defined by the owner of the scheme identified. The string may use URN or URL syntax. When a URL is used, it is recommended to also contain a month-date in the form mmyyyy; the assignment of the URL must have been authorized by the owner of the domain name in that URL on or very close to that date. A URL may resolve to an Internet location, and a location that does resolve may store a specification of the message scheme.

— value: is a null-terminated ('C') string in UTF-8 characters that specifies the value for the event. The value space and semantics must be defined by the owners of the scheme identified in the scheme\_id\_uri field.

— timescale provides the timescale, in ticks per second, for the event duration and presentation\_time\_delta or presentation\_time fields. The value should be identical to the timescale of a track contained in the carrying Segment. Furthermore, the value should be identical for all events in one Event Stream.

— presentation\_time\_delta provides the Media Presentation time delta of the media presentation time of the event and the earliest presentation time in this segment. If the segment index is present, then the earliest presentation time is determined by the field earliest\_presentation\_time of the first 'sidx' box. If the segment index is not present, the earliest presentation time is determined as the earliest presentation time of any access unit in the media segment. The timescale is provided in the timescale field.

— presentation\_time provides the Media Presentation time of the event measured on the Movie timeline, in the timescale provided in the timescale field, and adjusted by **InbandEventStream**@presentationTimeOffset, in the time scale provided by **InbandEventStream**@timescale; the value shall not be less than the earliest presentation time of the carrying Segment.

— event\_duration provides the duration of event in media presentation time. The timescale is indicated in the timescale field. The value 0xFFFFFFFF indicates an unknown duration. The interpretation of this value must be defined by the owner of the event scheme.

— id: a field identifying this instance of the message. The scope of this identifier for each event is with the same scheme\_id\_uri and value pair. Messages with the same id within the scope of the same scheme\_id\_uri and value pair are equivalent , i.e. processing of any one event message box with the same id is sufficient.

— message\_data: body of the message, which fills the remainder of the message box. This may be empty depending on the above information. The syntax and semantics of this field must be defined by the owner of the scheme identified in the scheme\_id\_uri field.

The flags field is specified as follows:

* (flags & 1) equal to 1 indicates that the esmg is an update of another esmg with identical values of scheme\_id\_uri, value and id fields.

1. Under preparation. [↑](#footnote-ref-1)