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 ISO/IEC JTC 1/SC 29/WG 03 N0300

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

**MPEG Systems   
Convenorship: KATS (Korea, Republic of)**

**Document type:** Output Document

**Title: Defects under Investigation (DuI) on DASH**

**Status:** Approved

**Date of document:** 2021-07-16

**Source:** ISO/IEC JTC 1/SC 29/WG 03

**Expected action:** ACT

**Action due date:** 2021-07-16

**No. of pages:** 8 (with cover page)

**Email of Convenor:** young.L@samsung.com

**Committee URL:** <https://isotc.iso.org/livelink/livelink/open/jtc1sc29wg3>

**INTERNATIONAL ORGANISATION FOR STANDARDISATION**

**ORGANISATION INTERNATIONALE DE NORMALISATION**

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

**ISO/IEC JTC 1/SC 29/WG 03 N** **0300**

**July 2021, Virtual**

|  |  |
| --- | --- |
| **Source** | **MPEG Systems working group** |
| **Status** | **Output** |
| **Title** | **Defects under Investigation (DuI) on DASH** |
| **Editor** | **Iraj Sodagar** |
| **Serial Number** | **20554** |

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# Introduction

This documents the defects under investigation for 23009-1, 4th Ed (DASH). It contains the substance of the following documents.

# Xlink usage, conformance to W3C, and remote entity element specification ([m53957](http://wg11.sc29.org/doc_end_user/documents/130_Alpbach/wg11/m53957-v1-m53957-TidyingUpXlink.zip))

This section has not been reviewed by the DASH AHG.

This section makes reference to the DASH normative reference to the W3C XLINK standard:

[XML Linking Language (XLink) Version 1.1](https://www.w3.org/TR/xlink11/)

## Type, href, show and actuate are supported inconsistently on different elements

These xlink attributes are documented in Section 5.5. But not all DASH elements permit xlink:type and xlink:show. They should be used consistently (but see next issue below).

## As constrained, type and show do not appear to be useful

These attributes are “fixed” to the values “simple” and “embed” respectively – that is if used, they can \*only\* be set to this one value each. For xlink:type, “simple” is the W3C default value, so the addition of this seems redundant. There is no defined semantics in DASH for xlink:show, which was intended by W3C to control the visual presentation in e.g. HTML which frame a new resource is displayed. I’m not sure what DASH would do with this semantic use.

## Actuate asserts a default value of “onRequest” in Table 4

There is no W3C default value for xlink:actuate so this deviates from W3C which would otherwise require xlink:actuate to be present. Table 4 just asserts a statement of fact about this which is not technically true. Is this deviation necessary? Why not just require xlink:actuate if xlink:href is present?

## Actuate only mentions “onLoad” and “onRequest” values

No problem, but there is no conformance language in Table 4, just a statement of fact about this which is not technically true.

## Xlink support is only on a few elements

Xlink is explicitly supported by the spec syntax tables only for the following elements:

* Period
* AdaptationSet
* SegmentList
* InitializationSet
* EventStream

Although there is not explicit support for xlink on the MPD element, Section 5.5.3 discusses the handling of this case which is inconsistent.

## All normal element attributes are optional when href is present

All syntax tables have this note:

Note that the conditions [column] only holds without using xlink:href. If linking is used, then all attributes are "optional" and <minOccurs=0>

This violates the provisions of 5.5.3. Further 1) that would make the element invalid WRT to the schema and 2) the xlink resolution could fail in which case processing of the original element is expected as described in 5.5.3.

## Remote element entity contents vary

For elements that support xlink, the content referenced by xlink:href varies by element:

* MPD – one MPD element (maybe – not explicitly enabled in the syntax, but see 5.5.3)
* Period – one or more Period elements
* AdaptationSet – one AdaptationSet element
* SegmentList – one or more SegmentList elements
* InitializationSet – one InitializationSet element
* EventStream – one EventStream element (worded unclearly)

No problem, but Period and SegmentList are unique and there is no statement about why the other elements do not support xlink.

## The XML conformance of the remote element entities are not clear

The spec is silent about conformance of the remote element entities except for the type and number of elements. Should it conform to an “MPD”, i.e. it has an MPD as the main element and conforms to the MPD schema? Or is it just the element(s), e.g. just one or more Period elements?

The 4th Edition schema added Period as a top-level element, thus enabling Period alone to be conformant. The other elements are not currently supported.

Example G.11 is an example of a Period xlink, but the remote element entity is a valid MPD (i.e. with an MPD element).

We should consider a new namespace for a new schema that enforces the supported xlink remote element entities; and remove the new stand-alone Period from the MPD schema.

## Nested href is permitted except when actuate=”onLoad”

Section 5.5.3 declares this case to be “invalid circular references”. This is not explained especially when apparently the nested xlink construction is OK for xlink:actuate=”onRequest”.

## Xlink processing is profile-dependent and apparently optional

Section 8.3.2, 8.4.2 and 8.5.2 dealing with the On Demand, Live and Main profiles say:

Elements using the @xlink:href attribute may be ignored from the MPD. The Representations conforming to this profile are those not accessed through an Adaptation Set that uses an @xlink:href.

Section 8.6.2 for MP2TS profile says:

It shall be possible to present a presentation conforming to this profile without resolving @xlink:href in AdaptationSet or SegmentList elements. Any initial Period elements using @xlink:href may be ignored, and the first non-excluded Period shall have an explicit @start attribute. After the first non-excluded Period, there shall be no Period using @xlink:href.

# On usage of edit list + audio codec (aac) + multi-period with continuity/connectivity signalling ([m55420](http://wg11.sc29.org/doc_end_user/current_document.php?id=76477&id_meeting=184))

aac preroll

(1 or 2 aac packets)

First Period boundary

Second period boundary

Period continuity

Segment 1

K +

2 samples

Segment 2

K samples

Segment 3

K samples

Segment 4

K samples

Segment 2-1

K samples ??

Segment 2-2

K samples

Segment

K samples2-3

Third period boundary

No period contintinuity

Segment 3-1

K samples + 2

Segment 2-1

K + 2samples ??

Segment 3-1

K samples ??

Option 2 apply edit list again

Option 3 don’t apply edit list

aac preroll

(1 or 2 aac packets)

Segment duration in mpd = K \* d\_sample

Apply edit list again

Description of the issue:

1. First period may be different case from 2nd or 3rd period when handling content with editlist
2. For period continuity, preroll may not be needed as playback is continuous, but what if a player starts from the second period, what would be the right strategy to start playback ?
3. Either different segments need to be created (a segment with K samples vs K + 2 samples),
4. or duration of first segment timeline is shorter e.g. (K-2) \* d\_sample , but this is ambiguous based on wether editlist would need to be applied again after the period boundary or not
5. Still differences may exist between first period, a continuous period and a non-continuous period with regard to applying the edit again
6. Problem may be worse for codecs with more delay
7. Doing nothing is easiest but check audio quality aspect and consider codecs with more delay
8. Consider documenting issue and possibly the best practices around this

Issues:

1. Is having a different edit list allowed for period continuity/connectivity?
2. How severe is not using a preroll sample (a sample removed by an edit)?
3. What would be the processing model for continuous playback of representations with different edit?

Specific defect from DVB, more detail on "logical continuation", especially regarding the fields in the manifest.

# Defects from DVB liaison ([m55478](http://wg11.sc29.org/doc_end_user/current_document.php?id=76535&id_meeting=184))

# Period Continuity and Connectivity

DVB developed its own descriptors for period continuity, and would like to adopt the ones defined in MPEG 3rd and 4th editions while keeping the specific requirements from DVB. While DVB thinks the intention of both texts are similar, it would like to assert that indeed a DVB-DASH period continuous period aligns with what was intended in MPEG and consider additional requirements to be adopted (in MPEG). This is because specific text was found missing in MPEG-DASH specification regarding specific requirements used in DVB-DASH.

Here are the requirements from current MPEG DASH for period continuity

“ *Media Presentations should signal period-continuous Adaptation Sets by using a supplemental descriptor on Adaptation Set level with @schemeIdUri set to "urn:mpeg:dash:period-continuity:2015" with*

*— the @value of the descriptor matching the value of an @id of a Period that is contained in the MPD, and*

*— the value of the AdaptationSet@id being the same in both Periods. MPD should signal period-continuous Adaptation Sets if the MPD contains Periods with identical Asset Identifiers.*

*There exist special cases for which the media in one Adaptation Set is a continuation of the previous one, but the timestamps are not continuous. Examples are timestamp wrap around, encoder reset, splicing, or other aspects. Two Adaptation Sets in one MPD are period-connected if all conditions from period-continuity from above hold, except that the timestamps across Period boundaries may be non-continuous but adjusted by the value of the @presentationTimeOffset at the Period boundary. However, for example the Initialization Segment is equivalent within the two Adaptation Sets. Media Presentations should signal period-connected Adaptation Sets by using a supplemental descriptor on Adaptation Set level with @schemeIdUri set to "urn:mpeg:dash:period-connectivity:2015". Period continuity implies period connectivity.* ”

DVB-DASH adds to the requirement of being Associated as below.

“ If Adaptation Sets in two different Periods are associated, then the following parameters shall be identical for the two Adaptation Sets:

• the language as described by the @lang attribute;

• the media component type described by the @contentType attribute;

• the picture aspect ratio as described by the @par attribute;

• any role properties as described by the Role elements;

• any accessibility property as described by the Accessibility elements;

• any viewpoint property as described by the Viewpoint elements;

• for audio Adaptation Sets, all values and presence of all attributes and elements: @mimeType, @codecs, @audioSamplinigRate, @AudioChannelConfiguration

NOTE: Additional requirements may apply to specific content protection schemes, the details of which are outside the scope of the present document. “

The key question is if this matches the “logical continuation” of the media described in MPEG-DASH, and if so if some of these aspects more explicitly be mentioned in the MPEG-DASH specification?

If not, is what DVB specified in line with what was intended as appropriate for MPEG period continuous periods. Last, would MPEG endorse DVB to apply to these additional constraints, considering that DVB content should playback on typically (all) DASH conforming players as it is intended by DVB-DASH, or are some requirements missing.

Another question/concern raised by a DVB member was regarding the usage of edit lists, by having equivalent initialisation segments, this would imply having the same editlist applied (i.e. not a new edit). This would mean that for example for aac segments in a continuous/connected period no different edit can be applied, and e.g. audio priming samples would be played by the client. DVB would like to understand if 1. This is the intended behaviour and 2. If MPEG thinks there are any perceptual effects caused by this.

Please let us know if

1. The DVB requirements map with what was intended in MPEG-DASH
2. If any updates are planned to the MPEG-DASH specification to include some of the specific requirement for DVB, this allows DVB to update its own specification to introduce less specific requirements for period continuity
3. If the behaviour with edit lists was intended and if MPEG things there are any perceptual effects to not having for example no priming samples for audio in a continuous period.

# Track role signalling and its intended usage and usage in ETSI 103 285

MPEG-DASH 3rd and 4th define new rack roles such as forced subtitles and several others. DVB used EBU TT D which is based on ttml, and in ttml such signatures can be signalled aswell. In addition, many DVB-DASH clients cannot render multiple timed text adaptationsets simultaneously. DVB would like to understand better the intended usage of the track roles by MPEG. It seems that for DVB-DASH the best option is:

1. Signalling multiple track roles per timed text track/Adaptationset while keeping the number of AdaptationSets limited, serving subtitles with different track roles in a single track/AdaptationSet
2. For some special cases, if deemed necessary a separate AdaptationSet with only specific track roles may be created, i.e. hard hearing subtitles, forced subtitles

Could MPEG elaborate if this usage aligns with what was intended by the MPEG-DASH specification?

# Event related defects

# Questions and potential defects on DASH-specific events ([m57570](https://dms.mpeg.expert/doc_end_user/current_document.php?id=79762&id_meeting=187))

* Two general questions: the processing model for dispatch *on\_receive* or *on\_start* should be described for DASH specific events as well in order to understand their behaviour. This would help implementors to decide on their implementation. Can this be added/reviewed? We would expect on\_receive to be the default but the callback event should be on\_start.
* In **clause 5.10.4.2** 0xFFFF should be 0xFFFFFFFF
* In **clause 5.10.4.5.** There is a deprecation of @messageData, is there a requirement for character escaping on the URL? Is there foreseen a way to use the value space instead?
* Reviewing clause **A.13** brought up the following questions:
* A.13 distinguishes DASH-specific and application related events, is this distinction explicit (i.e. is there a list)? Can an application subscribe to DASH specific Events ? This is not explicitly restricted. Some native DASH clients do not support all native events.
* If an application cannot subscribe to DASH specific events, it would not need to create events with same features, it may be easier both implementation-wise to expose both native and application events? This way DASH players can also be tested more consistently for support of DASH specific events, also, we have seen that some native players don't implement some of the DASH specific event processing, so allowing to do this at the application level may be beneficial. Can this question of subscribing to DASH specific events be added to the DuI?
* Still @messageData is used in the processing should also mention the recommended way of storing the event in the value space in addition (defect)? Should A.13 also account for data that is not stored in @messageData e.g. Table A.2 . Inconsistencies in specification may make consistent implementation difficult to impossible (e.g. @messageData usage for example and inconsistent dispatch mode handling).

# Explicit timing constraint attributes for (Inband) EventStream ([m57406](https://dms.mpeg.expert/doc_end_user/current_document.php?id=79598))

For content authors, authoring Events in DASH is challenging, especially, native DASH clients may not take into consideration intended processing be a specific schemeIdUri (e.g. on-receive, on-start) or how long in advance an Event should be announced in a dynamic MPD. To enable robust server and client-side support for event processing we recommend explicit signalling of intended timing properties. This way an encoder/packager or client can exhibit the correct behaviour,which is important, especially in live (@type=”dynamic”) cases.

Table 38 — Event Stream Semantics

|  |  |  |
| --- | --- | --- |
| @preAnnounceTime | O D=0 | Events targetting presentation\_time T will be available in an MPD update on at least @preAnnounceTime seconds before T. In case of InbandEventStream it will be available in a segment that starts at least @preAnnounceTime seconds before the intended event presentation time |
| @removeTime | O D=0 | In case of EventStream, the MPD Event may be removed from the manifest @removeTime seconds from the MPD when it is expired and no segments with a presentation time overlapping the Event are available. |
| @dispatchMode | O D=”on-recieve” | the client processing is “on-recieve” or “on-start” DASH client is expected to dispatch events in on-receive or on-start mode |

Example of adding an Event after an MPD update:

live edge NOW event presentation time

| | <- @preAnnounceTime -> |

We recommend the added signalling to be added to Amendment 2 of DASH.

## **Client processing model**

There is no need to change the text in Annex A, but it will become implementable for the case the @dispatchMode is signalled in the MPD and set to on-start. The default remains on receive, but on-start has some important applications as well that are enable by this modification.