

The DASH Update

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Mile High Video 2019

report

MPEG DASH 3rd Edition



- **Publication date : 2019-07**

3rd Edition: ISO/IEC 23009-1:2019

2nd Edition

ISO/IEC 23009-1:2014

- | | |
|---|---|
| 1. Server-client NTP sync | 11. Content annotation & client selection |
| 2. Extended profiles | 12. Server-client NTP sync |
| 3. SRD | 13. Content annotation & client selection |
| 4. URL param insertion | 14. Signaling for quality |
| 5. Role extensions | 15. Flexible segment & Broadcast TV profile |
| 6. AuthN/AuthZ | 16. MPD chaining |
| 7. NTP anchor | 17. MPD fallback |
| 8. External MPD link | 18. Preselections |
| 9. Period continuity | 19. Data URLs in MPD |
| 10. Generalized HTTP header extensions & queries tracks in DASH | 20. Labels |
| | 21. Switching cross adaptation sets |



Revisions / Corrigenda

Previously

- ⦿ ISO/IEC 23009-1:2014
- ⦿ ISO/IEC 23009-1:2014/Amd 1:2015
- ⦿ ISO/IEC 23009-1:2014/Amd 2:2015
- ⦿ ISO/IEC 23009-1:2014/Amd 3:2016
- ⦿ ISO/IEC 23009-1:2014/Cor 1:2015
- ⦿ ISO/IEC 23009-1:2014/Cor 2:2015



Now

- ⦿ ISO/IEC 23009-1



Corrigenda/Amendments

- ⦿ ISO/IEC 23009-1/DAmD 1

MPEG DASH 4th Edition



4th Edition: ISO/IEC 23009-1:20XX

3rd Edition
ISO/IEC 23009-1:2019

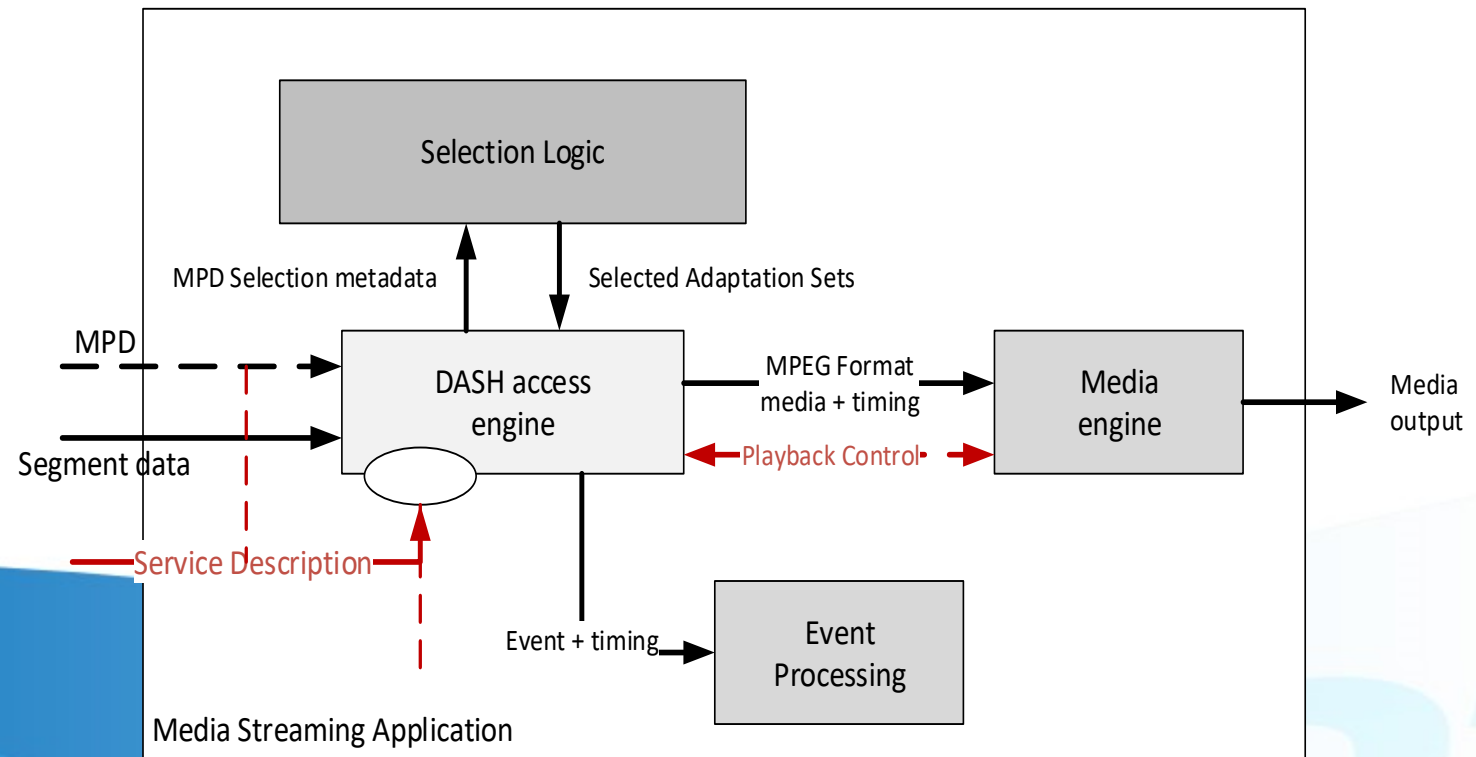
Amd 5

COR3

- Amendment 5 and COR 3 developed in 2018 and 2019

Service Description

- Provide information for playback of the content as intended by content provider



Service Description: Latency

- Provides the latency parameters for client

Key	Type	Description		
ReferenceID	Integer	Defines the MPD producer reference time against which the latency is measured if more than one is present.		
TargetLatency	Integer	The service provider's preferred presentation latency in milliseconds compared to the producer reference time. Indicates a content provider's desire for the content to be presented as close to the indicated latency as is possible given the player's capabilities and observations.		
MaximumLatency	Integer	The service provider's indication about the maximum presentation latency in milliseconds. Indicates a content provider's desire for the content not to be presented if the latency exceeds the maximum latency.		
MinimumLatency	Integer	The service provider's indication about minimum presentation latency in milliseconds for example to avoid inconsistencies with second screen applications, overlays, etc.		
	Entry	Object	A list of latency and quality pairs.	
		Latency	Integer	A latency value for the service in milliseconds.
		Quality	Integer	The quality of the service at the above latency with 0 being the lowest and 100 being the highest.
		QualityType	URI	Defines the interpretation of the value of Quality. If not present, the quality is considered in linear scale.

Service Description: Operating Quality

- Provides the desired range of quality for client

Key	Type	Description
MediaType	string	Defines the media type for which the playback applies. They type can be <ul style="list-style-type: none">- video: applies to video- audio: applies to audio- any: applies to any media type
MinQualityRanking	Integer	Minimum quality ranking value desired through this presentation for the above MediaType. This is the smallest desired value for the @qualityRanking attribute for the selected Representations to be played by the DASH client during regular playback.
MaxQualityRanking	Integer	Maximum quality ranking value desired through this presentation for the above MediaType. This is the largest desired value for the @qualityRanking attribute for the Representations to be played by the DASH client during regular playback.
TargetQualityRanking	Integer	Quality ranking value desired through this presentation for the above MediaType. This is the target value for the @qualityRanking attribute for the Representations to be played by the DASH client during regular playback.
QualityRankingType	URL	Defines the interpretation of the value of Quality Ranking attribute. If not present, the quality is considered in linear scale.
MaxQualityDifferencel	Integer	Maximum quality difference value recommended by the content author for the presentation for the above MediaType. This is the recommended quality difference value between the @qualityRanking attribute for the quality-equivalent Representations (section 5.8.5.12) to be played by the DASH client during regular playback. This is typically applicable for Representations that are picked from an Adaptation Sets within one Preselection.

Service Description: Operating Bandwidth

- Provides the desired range of bandwidth for client

Key	Type	Description
MediaType	string	Defines the media type for which the playback applies. They type can be <ul style="list-style-type: none">- video: applies to video- audio: applies to audio- any: applies to any media type- all: applies to aggregation of all Representations
MinBandwidth	Integer	Minimum bandwidth value desired through this presentation for the above MediaType. This is the smallest desired aggregated value for the @bandwidth attribute for all Representations of this media type to be played by the DASH client during regular playback.
MaxBandwidth	Integer	Maximum bandwidth value desired through this presentation for the above MediaType. This is the largest desired aggregated value for the @bandwidth attribute for all Representations of this media type to be played by the DASH client during regular playback.
TargetBandwidth	Integer	Target bandwidth value desired through this presentation for the above MediaType. This is the largest desired aggregated value for the @bandwidth attribute for all Representations of this media type to be played by the DASH client during regular playback.

Initialization Set, Group and Presentation

- Set: Signals the requirements for playback one adaptation set
- Group: Signals the requirements for playback one media type through MPD and cross all periods
- Presentation: Signals the requirements for playback the expected presentation through MPD and cross all periods.

Initialization Group & Presentation provide a mechanism for both describing the content characteristics as well as the required device capabilities to play the presentation.

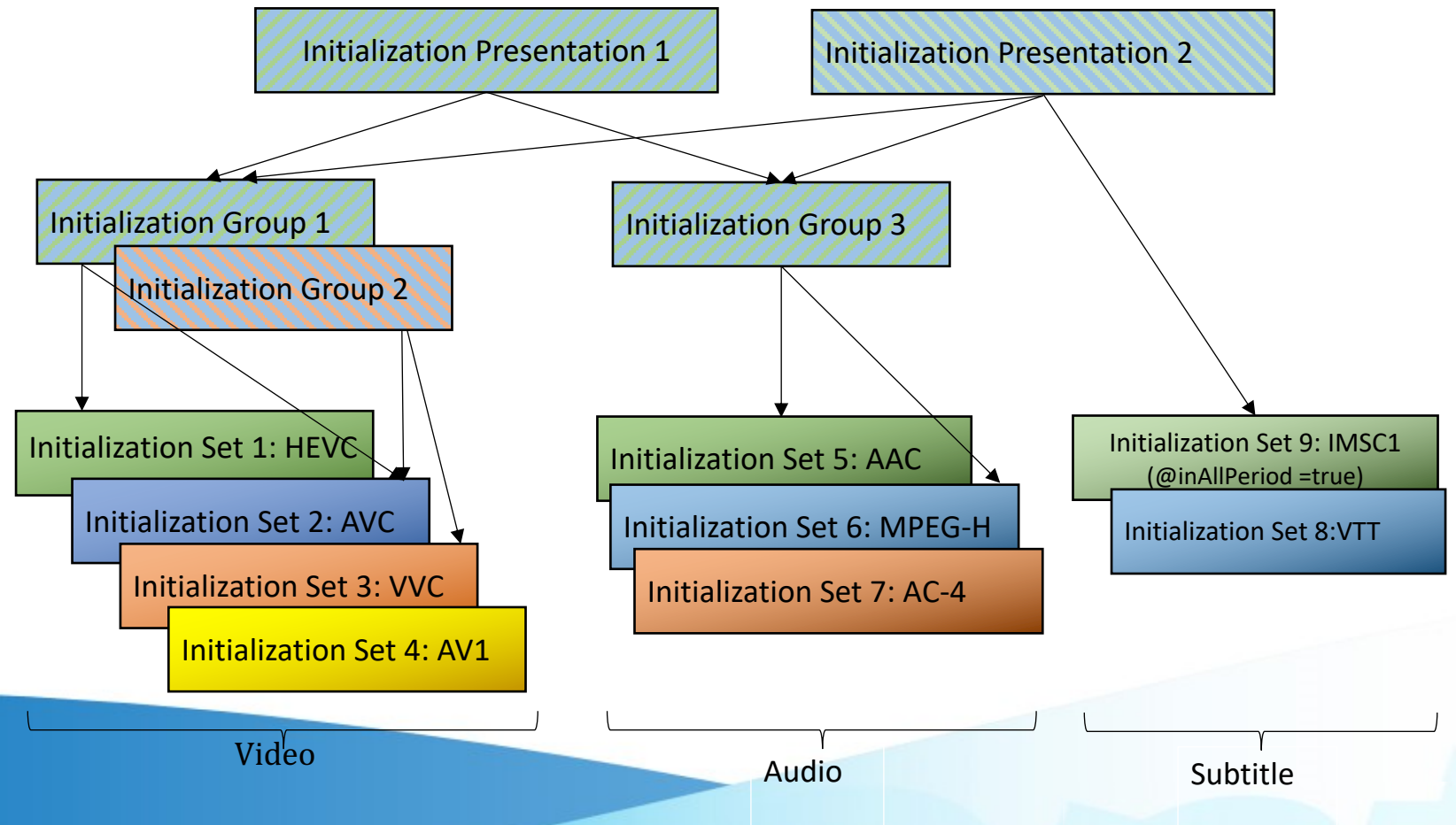
Element or Attribute Name		Use	Description
MPD			The root element that carries the Media Presentation Description for a Media Presentation.
	InitializationSet	0 ... N	specifies a suitable initialization for a specific media type for the presentation. If present, at least one Period of the Media Presentation shall include at least one Adaptation Set that can be played when initialized by this Initialization Set.
	InitializationGroup	0 ... N	specifies a group of Initialization Sets by a white space separated list of initialization set's ids of same content type to indicate that any Period in the Media Presentation has at least one Adaptation Set that conforms to one of the Initialization Sets referenced in this element.
	@id	M	specifies a unique identifier for this Initialization Group. The attribute shall be a unique unsigned integer value in the scope of the MPD and shall also be among Initialization Set and Initialization Group ids.
	@profiles	O	specifies a URI identifier for this Initialization Group. If present, the scheme shall conform to the Initialization Sets listed in this Initialization Group.
	@contentType	O	specifies the content type of Initialization Sets listed in the element.
	InitializationPresentation	0 ... N	specifies a group of Initialization Sets and/or Initialization Groups by a white separated list of initialization set's ids and Initialization groups to indicate that create a complete presentation. A client supporting all listed Initialization Sets and Initialization Groups of an Initialization Presentation is expected to be able to play the entire Media Presentation as intended by the service provider.
	@id	M	specifies a unique identifier for this Initialization Presentation. The attribute shall be a unique unsigned integer value in the scope of the MPD and shall also be unique among Initialization Presentation ids.
	@profiles	O	specifies a URI identifier for this Initialization Presentation. If present, the scheme shall conform to the Initialization Sets and Groups listed in this Initialization Presentation.
	@contentType	O	specifies the content type of initialization Groups listed in the element.

Initialization Set

- Initialization set has information for play back of one adaptations set
 - Similar to adaptation set element
 - No segment resources
 - Include initialization set that can be used for playback of any representation in the adaptation set.

Element or Attribute Name	Use
InitializationSet	
@xlink:href	O
@xlink:actuate	OD
@id	M
@inAllPeriods	OD Default: TRUE
CommonAttributesElements	-
@contentType	O
@par	O
@maxWidth	O
@maxHeight	O
@maxFrameRate	O
@initialization	O
Accessibility	0 ... N
Role	0 ... N
Rating	0 ... N
Viewpoint	0 ... N

Signaling required capabilities for playback of the content



Failover Content

- To signal the duration of a representation which is missing content
- Enables the client to switch to alternative Representations which carry actual content.

Element or Attribute Name	Use	Description
FailoverContent		specifies sections that contain failover content.
@valid	OD default: true	specifies whether the corresponding data results in a valid HTTP request or if the request is invalid and it is expected that a 404 is received when requesting the associated Media Segment.
FCS	1..N	specifies one continuous section of failover content.
@t	M	this value of this attribute minus the value of the @presentationTimeOffset specifies the MPD start time, in @timescale units, of the first sample in the alternative content section. The value of this attribute must be equal to or greater than the sum of the previous FCS element earliest presentation time and the sum of the contiguous section durations.
@d	O	specifies the alternative content section duration in units of the value of the @timescale. If not present, the alternative content section lasts until the start of the next FCS element, or until the end of the Period or until the end of MPD duration, whichever occurring first in the timeline.

MPEG DASH 4th Edition



4th Edition: ISO/IEC 23009-1:20XX

3rd Edition

ISO/IEC 23009-1:2019



1. Service Description
2. Initialization Sets, Groups and Presentation
3. Failover Content
4. Missing content segment signaling
5. Producer Reference Time
6. Leap second information
7. Content Popularity Rate
8. Device information metrics
9. Additional Role values
10. SegmentTimeline for low latency
11. Exact placement of content in Period
12. Preselection conformance rules
13. Representations' quality equivalent signaling
14. Improving Inband events timing signaling
15. Reference resolution w.r.t. Location element

- **FDIS: Expected to be issued by 8/9/2019**

MPEG DASH beyond 4th edition

4th Edition: ISO/IEC 23009-1:20XX

3rd Edition

ISO/IEC 23009-1:2019



ISO/IEC 23009-8: Session Based DASH operations

- Forensic water marking

AMD1

- Event and timed metadata processing model
- DASH profile for CMAF content

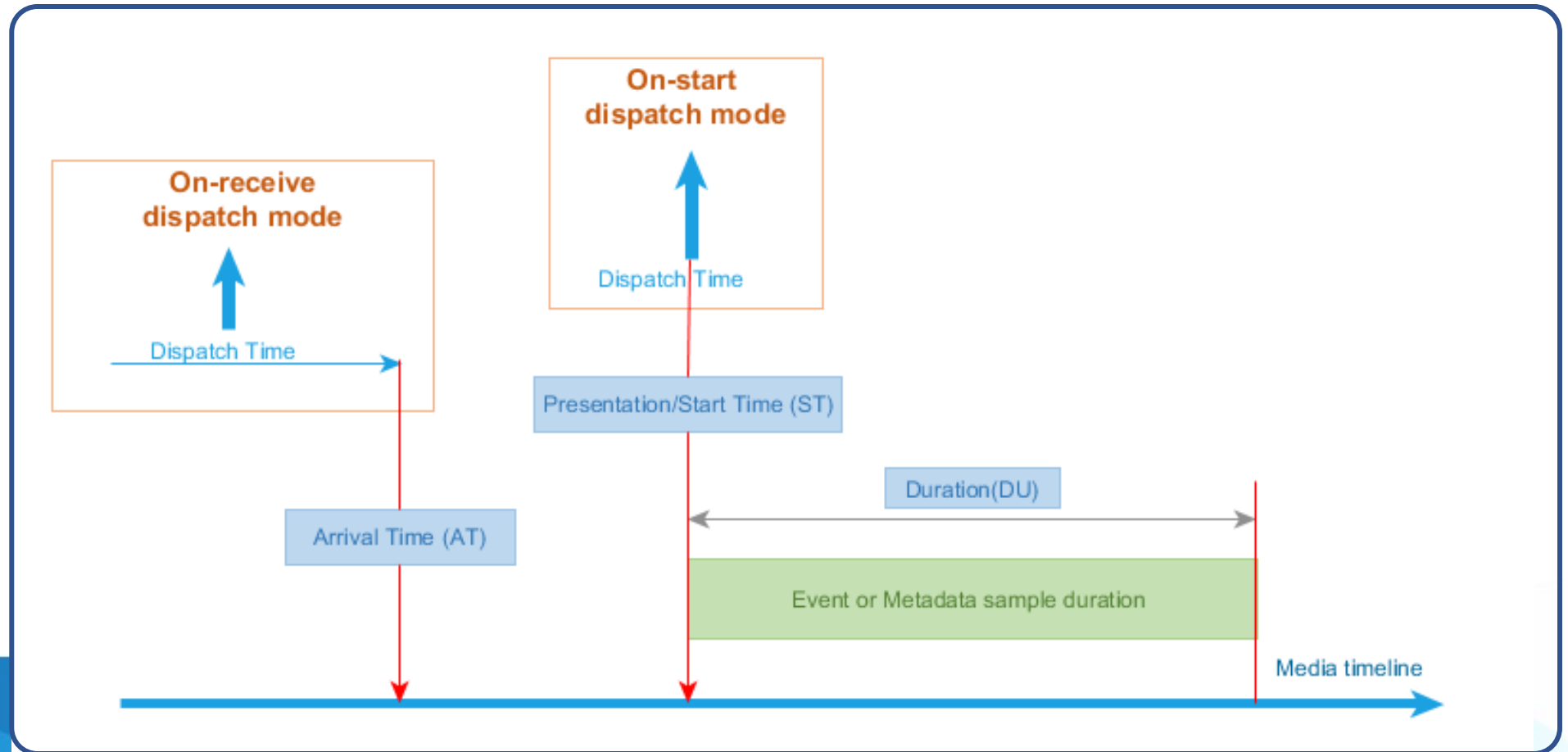
Technologies under consideration

- Pro-roll ad support
- Ads with Early Termination capabilities
- Dynamic storytelling
- VBR signaling

AMD1: DASH Events & Timed Metadata

- DASH-IF and MPEG recently developed a framework for DASH events and timed metadata:
 1. MPD events
 - Included in manifest
 - Can be updated with manifest update
 2. Inband events
 - Inserted in real-time at the beginning of media segments
 - Supports MPD update events and Application events
 3. Sparse timed metadata
 - Separate tracks than media
 - Metadata samples carry the payload
- All three mechanism can be dispatched to Application with the same API

AMD1: Event & Timed Metadata Dispatch Modes

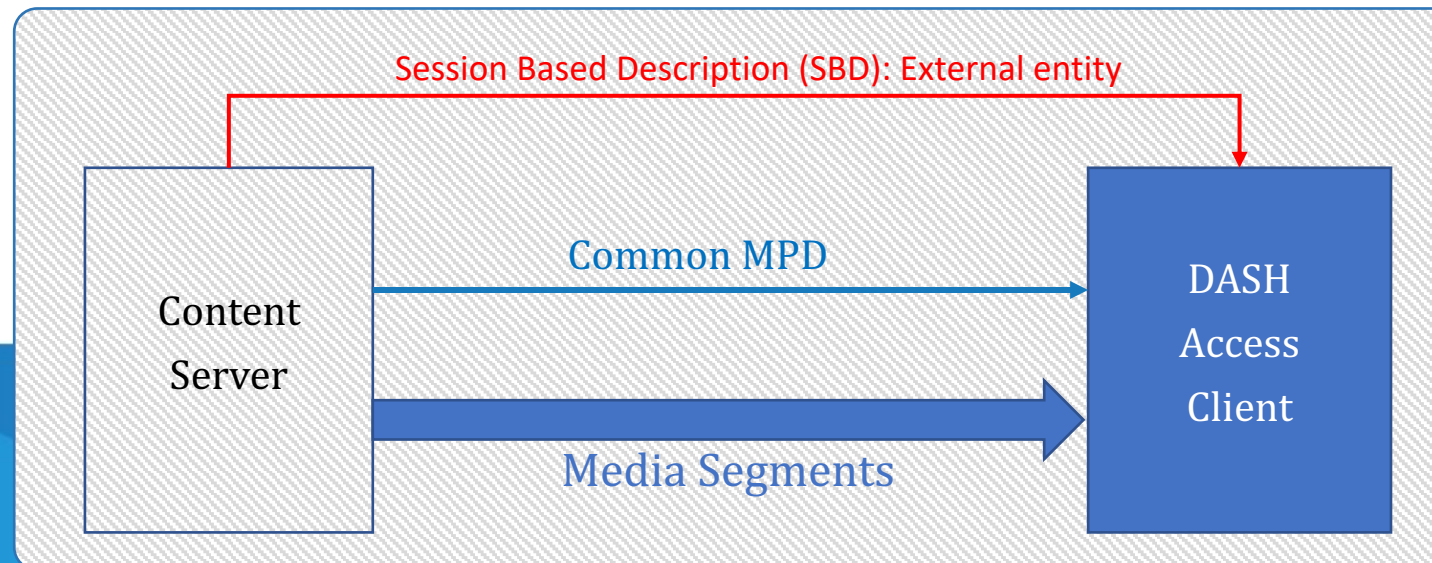


AMD1: DASH Profile for CMAF content

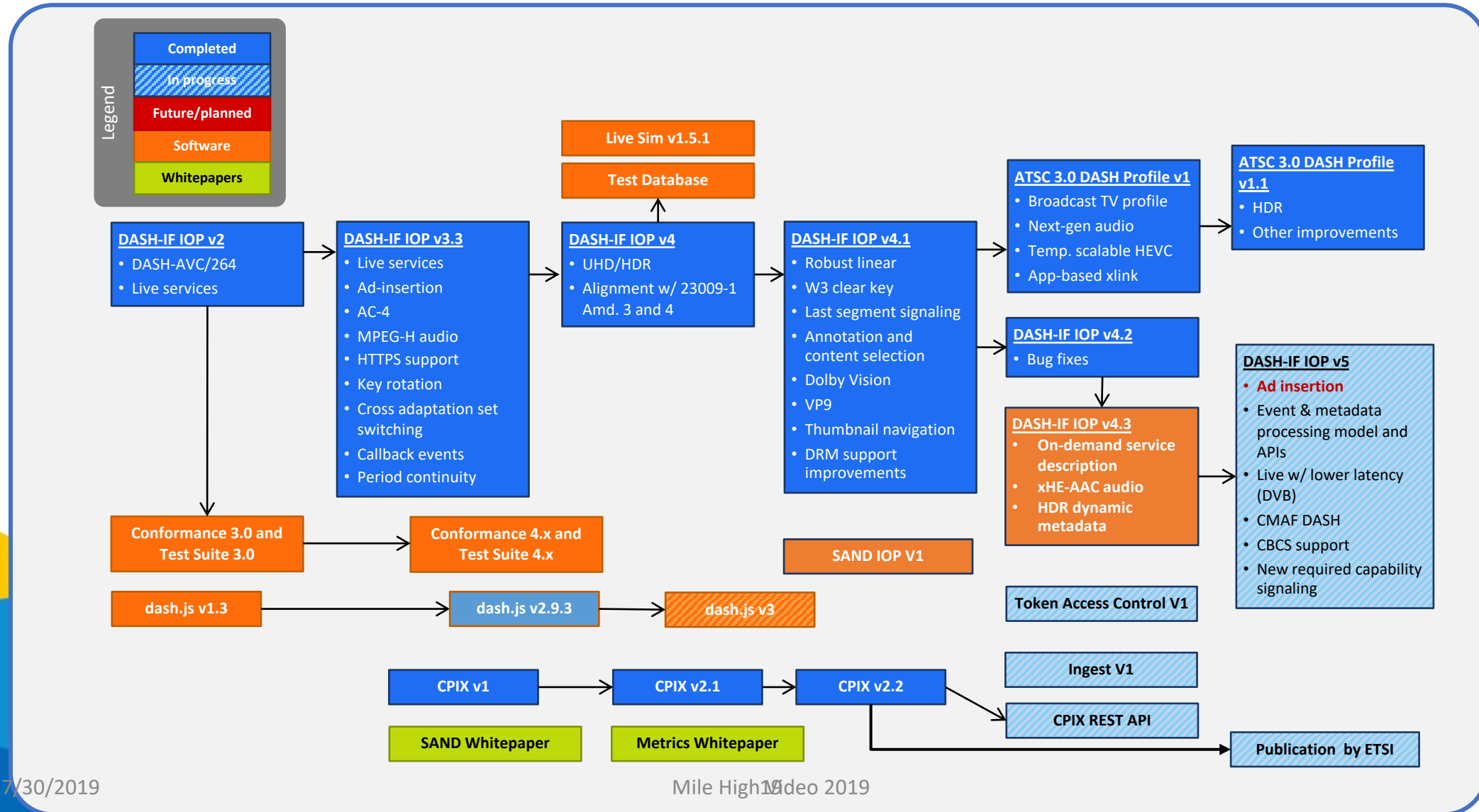
- Defines a normative mapping from CMAF content to DASH
- Necessary signaling at MPD
 - Period's constraints
 - Adaptation Sets constraints
 - Annotation and codec signaling
 - Segment address schemes
 - Content protection signaling
 - Conformance requirements

Part 8: Session Based DASH Operations

- When each client must perform a unique operation at each session
 - Single MPD to all clients
 - An external file (SBD) to define the operations for a specific client and session
- Example: Forensic watermarking
 - The segment addresses are modified for each client to build a unique signature for each session

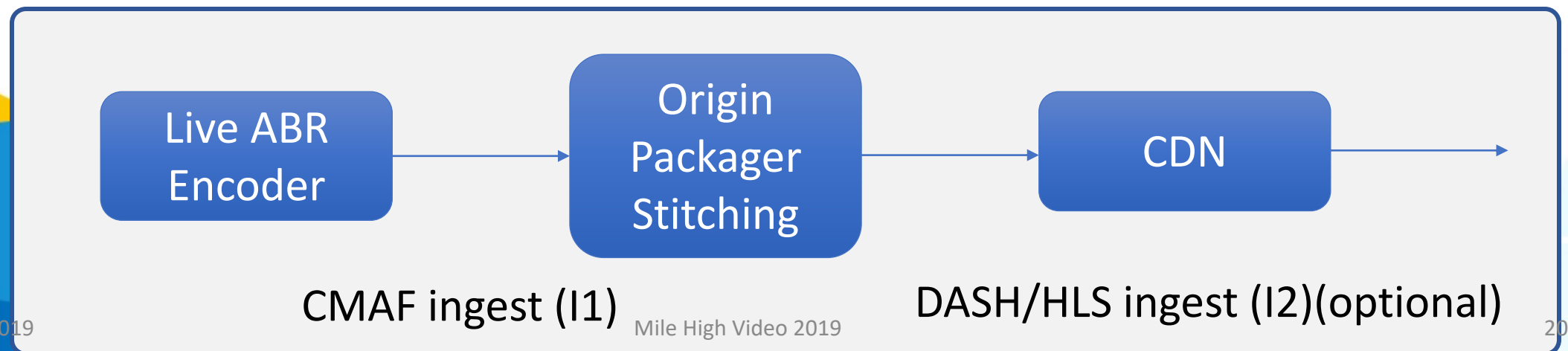


DASH-IF Current Workplan



DASH-IF Live Media Ingest Specification

- Defines two media ingest protocols:
 1. Interface 1: CMAF Ingest
 2. Interface 2: DASH/HLS Ingest
- All are HTTP POST (or HTTP PUT) based
- Status: Community Review

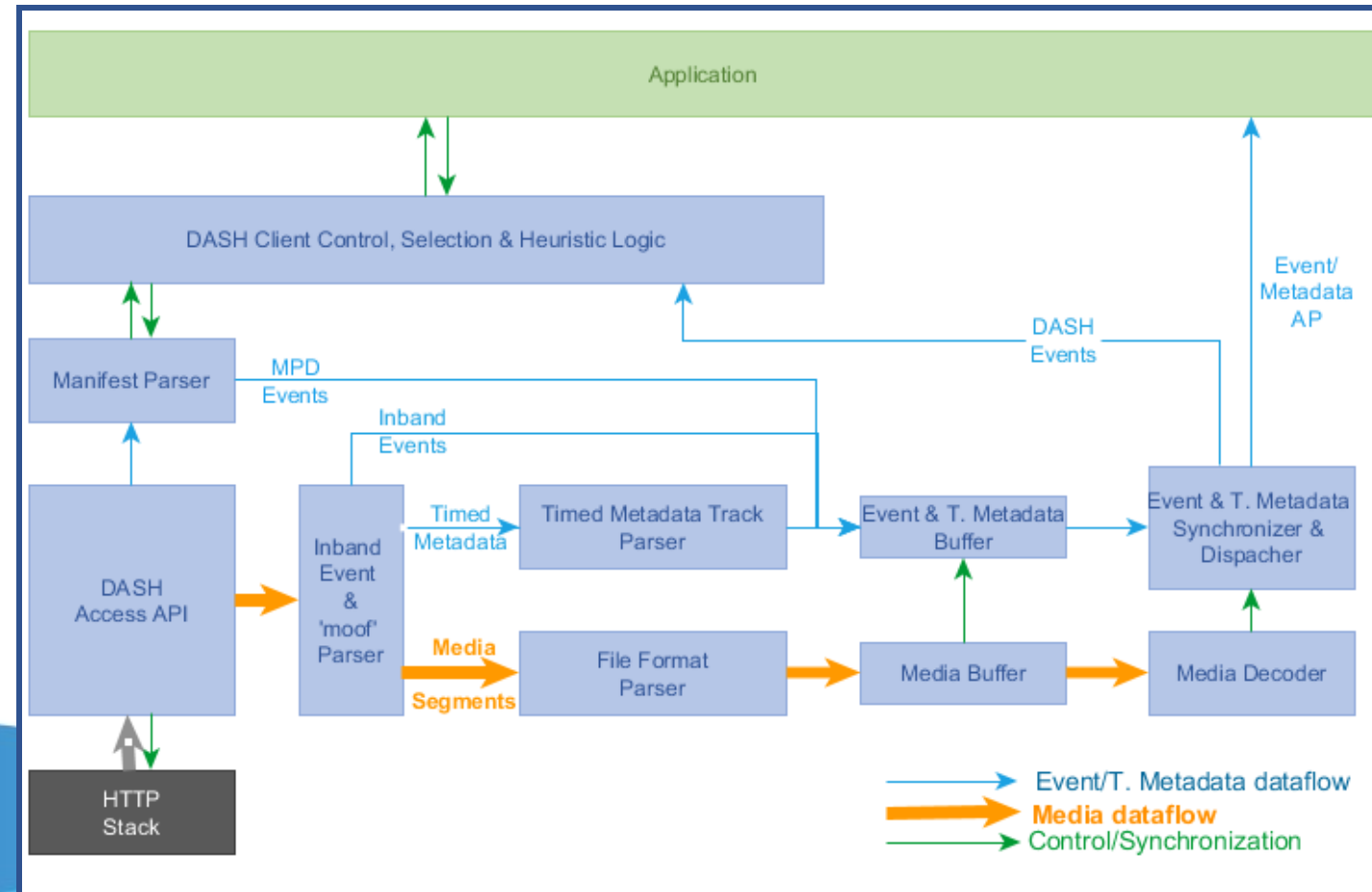


DASH-IF Low Latency DASH Guidelines

- Extend the DASH-IF IOP to support low latency DASH
- Uses CMAF Chunk encoding + HTTP 1.1 chunk encoding mode
- Supports all DASH-IF addressing schemes
- Uses MPEG-DASH 4th edition
 - Service Description
 - Producer Reference Time
 - SegmentTimeline addressing extension
- Status: Community Review

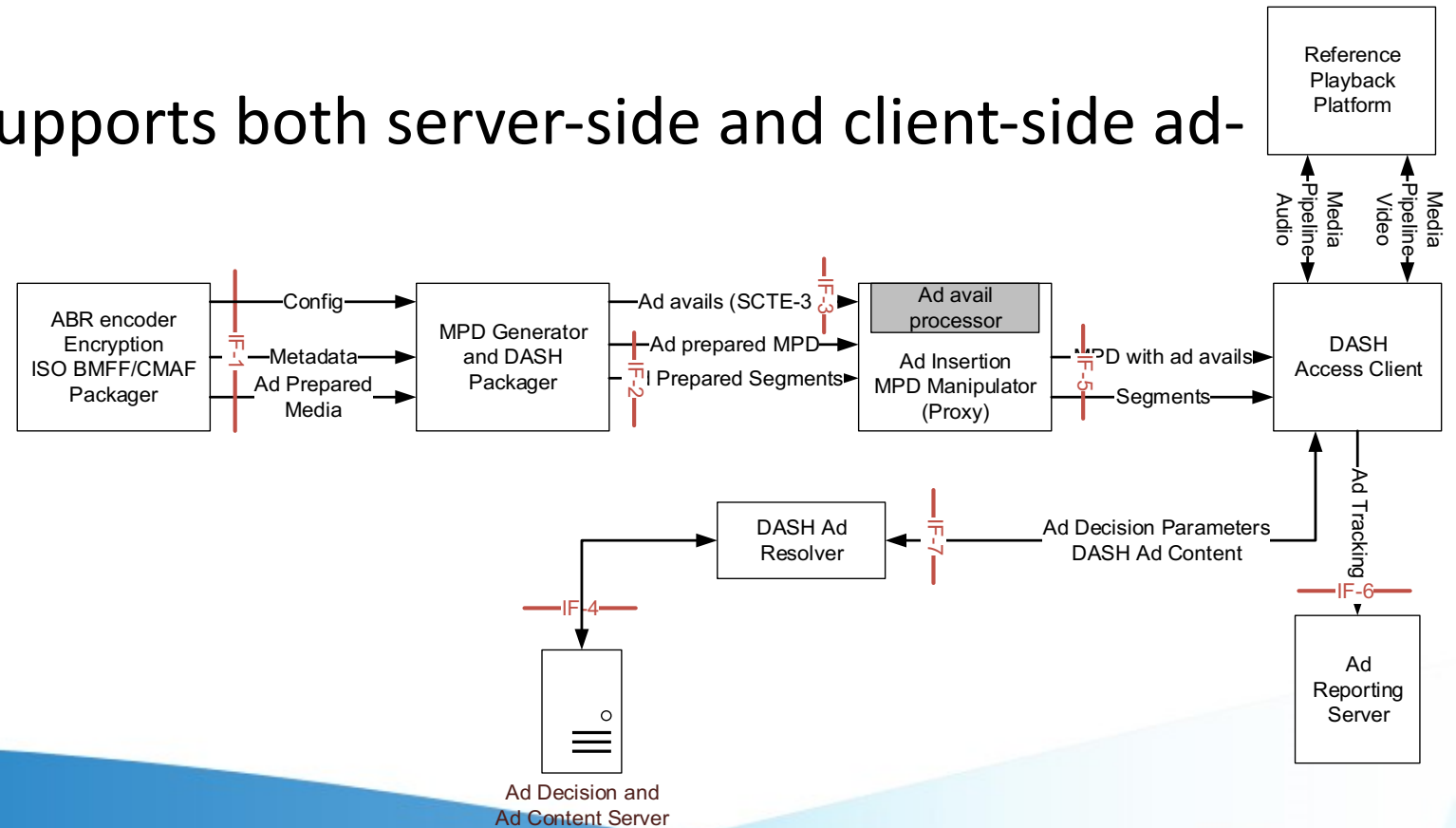
DASH-IF Event and Timed Metadata Processing API

- MPEG AMD1: Timing model
- DASH-IF guidelines: Client processing and API
- DASH-IF guidelines include a WebIDL instantiation of API
- Status: Community Review



DASH-IF guidelines/ MPEG Technology under Consideration: Ad Insertion General Architecture

- Single architecture supports both server-side and client-side ad-insertion



Advanced Ad Insertion Use-cases

1. Pre-roll ad for live
 - Pre-roll ad playback before joining the live program
 - Single MPD
 - Targeted with variable duration per client
2. Live program with early terminating ads
 - Dynamic ad-insertion during live
 - Ad duration may be cut short during playback of the ad
 - Single MPD with targeted ad
3. Switching between different live feeds
 - Single MPD
 - Content is published as live program with independent MPDs/Periods

Current DASH Constraints & Challenges

- Single timeline for periods
 - All period have single anchor: **MPD@availabilityStartTime**
- Events are tied to Periods/Representations
 - MPD events are period dependent
 - Inband events are stream dependent
- Confusion on how to use and handle Xlink:
 - MPD update constraints
 - Continuity of timeline
 - Xlink resolution timing and consistency
- Client implementations do not want to support MPD chaining

What MPEG and DASH-IF like to address

- We would like to design the advanced ad-insertion use-case such that:
 - Entry point is MPD
 - Single MPD for all clients
 - Easy content authoring, i.e. easy to update an MPD
 - Existing client implementation software architecture easily allow the next extensions
- Reasonable additional complexity cost for addressing the use cases
- We need feedback on:
 - Whether the service providers care about use-cases
 - What are the real-world scenarios?
 - What levels of complexity are acceptable?

Discussion: Questions for Service Providers

Use-case/Feature	Not needed	Good to have	Must have
• Pre-roll ads			
• Variable ad-duration per client?			
• Can ad be terminated shortly by the client?			
• Early terminating ads			
• Any advanced notice duration by live server?			
• Any minimum playback duration of ad?			
• Can ad be terminated in the middle of ad?			
• Seamless transition during switching back to live content?			
• Standard signaling between live server and ad-server for ad selection/preparation?			

Where to Find DASH-IF's Resources

- Website: <http://dashif.org>
- Guidelines: <http://dashif.org/guidelines/>
- Test assets: <https://testassets.dashif.org/>
- Conformance: <https://conformance.dashif.org/>
- Software and document projects : <https://github.com/Dash-Industry-Forum/>
- Academic events: <https://dashif.org/academic/>
- For joining: <https://dashif.org/membership/>

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*To lead and impact:
Join DASH-IF!*