

# Guidelines for Implementation: DASH-IF Interoperability Points

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**This version:**

<https://dashif.org/guidelines/>

**Issue Tracking:**

[GitHub](#)

**Editors:**

DASH Industry Forum

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## **1. Document editing notes§**

Documentation: <https://dashif.org/DocumentAuthoring/>

Example document repository: <https://dashif.org/DocumentAuthoring/>

Live discussion in #document-authoring on Slack.

Scope Disclaimer

## 2. Introduction§

## 3. References§

See v4.3 references

## 4. Conventions, Context, Terms and Definitions§

### 4.1. Relation to MPEG-DASH§

### 4.2. Conventions§

- usage of keywords
- Formats

see v4.3 and bug filed by Sander

### 4.3. Abbreviations§

see v4.3

### 4.4. Terms and Definitions§

see v4.3 (may be hotlinked in bikeshed, auto generated)

## 5. General DASH Features§

### 5.1. Architecture§

- High-level end-to-end streaming architecture
- ABR Encoder
- Encryption
- File Format Architecture
- DASH Packager and MPD Generator
- Origin Server
- CDN
- DASH Client
  - DASH access client
    - Selection
    - Download

- Media Pipeline

Reference other DASH activities (Ingest, CPIX, SAND, etc.)

(re-use low-latency architecture)

## 5.2. Formats§

(new clause with some usage from clause 3.2.1)

### 5.2.1. MPD§

- General high-level requirements

### 5.2.2. Segments§

- Segment Formats in DASH
- Requirements
- Connect to CMAF and cmf2

### 5.2.3. Segment Addressing Schemes§

- SegmentTemplate
  - \$Number\$ and \$Time\$
- Self-Initializing
  - Single Segment with Segment Index
- Explain why we use different addressing
- Follows clause 3.5 of <https://dashif-documents.azurewebsites.net/DASH-IF-IOP/pull/210/DASH-IF-IOP.html#timing-addressing>

## 5.3. Protocol Considerations§

See clause 3.4 in v4.3

## 5.4. Location and Reference Resolution§

See clause 3.2.15 in v4.3

## 5.5. Client-Server Synchronization§

See clause 3.5 and 4.7 in v4.3

<https://dashif-documents.azurewebsites.net/DASH-IF-IOP/pull/210/DASH-IF-IOP.html#timing-sync>

## 5.6. Client Reference Model§

Refer to dash.js and MSE

(new clause) point to CTA WAVE Device Playback

## 5.7. Media Presentation Data Model§

### 5.7.1. Timing Model§

- Features
- Content Offering Requirements and Recommendations
- Client Requirements and Recommendations

See 3.2.7 and document from Sander

<https://dashif-documents.azurewebsites.net/DASH-IF-IOP/pull/210/DASH-IF-IOP.html#timing-period>

<https://dashif-documents.azurewebsites.net/DASH-IF-IOP/pull/210/DASH-IF-IOP.html#timing-representation>

### 5.7.2. Content Annotation and Selection§

- Features
- Content Offering Requirements and Recommendations
- Client Requirements and Recommendations

See 3.9 and document from Sander

### 5.7.3. Adaptive Switching§

- Features
- Content Offering Requirements and Recommendations
- Client Requirements and Recommendations

(Adaptation Set, segment and subsegment alignment)

<https://dashif-documents.azurewebsites.net/DASH-IF-IOP/pull/210/DASH-IF-IOP.html#timing-segmentalignment>

### 5.7.4. Segment Timing§

See clause 4.3 as well as document from Sander 3.5-3.5.4

<https://dashif-documents.azurewebsites.net/DASH-IF-IOP/pull/210/DASH-IF-IOP.html#timing-sampletimeline>

- @duration
- Segment Timeline
- Segment Index

## 5.8. Bandwidth Signaling§

- Minbuffertime
- @bandwidth
- Segment Index

See clause 3.2.8

## 5.9. Service Types§

See clause 3.6

On-Demand Services

- On-Demand Services
  - MPD Signaling
  - Reference to clause X
- Live Services
  - Content availability, time shift window and presentation delay concepts (Sander's 3.8-3.9.4)
  - MPD Signaling
  - MPD updates (Sanders 3.8.5)
  - Reference to clause X

## 5.10. Media in DASH§

(new clause)

### 5.10.1. Media in one Period§

- Features
- Content Offering Requirements and Recommendations
- Client Requirements and Recommendations
- Text from Sander 3.6

### 5.10.2. Media Across Periods§

- Features
- Content Offering Requirements and Recommendations
- Client Requirements and Recommendations
- Text from Sander 3.7

### 5.10.3. Requirements and Recommendation for Media Codecs in DASH§

- General Statements on how to add
- Capabilities
- Requirements on what needs to be defined (CMAF relation)

## 5.11. Events§

(new clause)

## 5.12. Remote Elements§

(new clause)

Text from Sander 3.9

<https://dashif-documents.azurewebsites.net/DASH-IF-IOP/pull/210/DASH-IF-IOP.html#timing-xlink>

## 5.13. Profiles and Interop§

Clause 2.4

## 5.14. Examples§

Clause 2.4

## 6. On-Demand Services§

Clause 3.10

## 7. Live Services§

Clause 4, but reduced as some issues are moved to general clause

<https://dashif-documents.azurewebsites.net/DASH-IF-IOP/pull/210/DASH-IF-IOP.html#timing-dynamic>

## 8. Content Replacement and Ad Insertion§

Newly developed in Ad Insertion TF

- Content conditioning and splicing

## 9. Content Protection and Security§

Based on Clause

## 10. Video in DASH§

(new clause adding all codecs in IOP)

(focusses on very specific issues following the general requirements from clause 4)

### 10.1. General§

#### 10.1.1. MPD and Adaptation Set Signaling§

#### 10.1.2. Segment Formats§

### 10.2. H.264/AVC§

(add a table with media profiles and reference CMAF) (create a clause with specific issues)

## 10.3. H.265/HEVC§

(add a table with media profiles and reference CMAF) (create a clause with specific issues)

## 10.4. VP9§

## 11. Audio in DASH§

(new clause adding all codecs in IOP) (focusses on very specific issues following the general requirements from clause 4) test;

### 11.1. General§

#### 11.1.1. MPD and Adaptation Set Signaling§

#### 11.1.2. Segment Formats§

### 11.2. (Codec 1)§

(add a table with media profiles and reference CMAF) (create a clause with specific issues)

### 11.3. (Codec 2)§

(add a table with media profiles and reference CMAF) (create a clause with specific issues)

## 12. Subtitles in DASH§

(new clause adding all codecs in IOP) (focusses on very specific issues following the general requirements from clause 4)

### 12.1. General§

#### 12.1.1. MPD and Adaptation Set Signaling§

#### 12.1.2. Segment Formats§

### 12.2. (Codec 1)§

(add a table with media profiles and reference CMAF) (create a clause with specific issues)

### 12.3. (Codec 2)§

(add a table with media profiles and reference CMAF) (create a clause with specific issues)

## 13. Other DASH Features§

### 13.1. Seek Preview and Thumbnail Navigation§



## 14. Annex Exclusions from MPEG-DASH§

This section list the exclusions and forbidden options of MPEG-DASH. Sanders 3.10 Forbidden techniques goes here

### Conformance§

Conformance requirements are expressed with a combination of descriptive assertions and RFC 2119 terminology. The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in the normative parts of this document are to be interpreted as described in RFC 2119. However, for readability, these words do not appear in all uppercase letters in this specification.

All of the text of this specification is normative except sections explicitly marked as non-normative, examples, and notes. [\[RFC2119\]](#)

Examples in this specification are introduced with the words “for example” or are set apart from the normative text with `class="example"`, like this:

#### EXAMPLE 1

This is an example of an informative example.

Informative notes begin with the word “Note” and are set apart from the normative text with `class="note"`, like this:

Note, this is an informative note.

### References§

#### Normative References§

##### [RFC2119]

S. Bradner. [Key words for use in RFCs to Indicate Requirement Levels](#). March 1997. Best Current Practice.

URL: <https://tools.ietf.org/html/rfc2119>

