

Guidelines for Implementation: DASH-IF Conformance Software and Reference Client

November, 2014

DASH Industry Forum

Version 1.0



1 Scope

- 2 The scope of this document is to provide the definition of the conformance software and the ref-
- 3 erence client for DASH-AVC/264 Interoperability Points V2.0.

1 Disclaimer

2 This document is not yet final. It is provided for public review until November 25th, 2014. If you
3 have comments on the document, please submit comments at the following URL:

- 4 • <https://gitreports.com/issue/Dash-Industry-Forum/Conformance-Software>

5 DASH-IF members may alternatively

- 6 • submit comments at the github repository at [https://github.com/Dash-Industry-Fo-](https://github.com/Dash-Industry-Forum//Conformance-Software/issues)
7 [rum//Conformance-Software/issues](https://github.com/Dash-Industry-Forum//Conformance-Software/issues)

- 8 • or dashif+iop@groupspaces.com with a subject tag [Conformance]

9 Please add a detailed description of the problem and the comment. Based on the received com-
10 ments a final document will be published by December 15-th, 2014.

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1 List of Figures

2 **No table of figures entries found.**

3 Acronyms, abbreviations and definitions

4 For acronyms, abbreviations and definitions refer to DASH264 Interoperability Points [1].

5 In addition, the following abbreviations and acronyms are used in this memo:

6

1

2 **1. Introduction**

3 This document defines the conformance software and the reference client for the
4 DASH264 Interoperability Points [3].

5 The conformance software verifies if a given content is conforming to a specific DASH264
6 IOP and identifies any potential conformance issues. In addition, the test vectors docu-
7 mented in [4] are verified by the conformance software.

8 The reference client can be used to play content conforming to DASH264 IOP.

9 The usage guidelines for each of these software modules is documented in Section 2.
10 Features of conformance software and reference client are documented in Section 3 and
11 Section 4, respectively. Availability and access information is documented in Annex A

12 **2. Usage Guidelines**

13 **2.1. General**

14 This section provides the usage guidelines of conformance software and reference client.

15 **2.2. Conformance Software**

16 **2.2.1. General**

17 DASH264 Interoperability conformance is checked by using two software modules: DASH
18 conformance and Dynamic Service Conformance, respectively.

19 **2.2.2. DASH Conformance**

20 This tool provides the syntactical and semantic checks on a DASH264 MPD and ISO-
21 Base Media File Format DASH264 segments. It is provided as an online tool with a self-
22 explanatory graphical user interface. The MPD to be validated is provided as a web re-
23 source (MPD URL). Activating the “Submit” button validates the MPD and the segments
24 and prints the results. The usage guidelines of conformance software are specified in fur-
25 ther detail in Annex A of [2].

26

27 **2.2.3. Dynamic Service Conformance**

28 **2.2.3.1. General**

29 This tool verifies the timing related aspects of dynamic services (MPD updates, Segment
30 availability). Dynamic Service Conformance is provided as an online tool with a self-ex-
31 planatory graphical user interface.

32

1 **2.2.3.2. Controls**

2 **2.2.3.3. MPD input**

3 The MPD URL can be selected from a set of known live services or can be manually
4 entered in the text box. Hitting start initiates the processing.

5

6 **2.2.3.4. Outputs**

7 **MPD status**

8 Last 5 instances of MPD updates with relevant data such as the number of new segment
9 URLs provided is displayed.

10

11 **Segment request progress**

12 The following information is displayed:

- 13 • A summary of processed and successful segment requests. Successful means a
14 200 code was received in reply for a segment request.
- 15 • A moving average of RTT for requests (last 10 values).
- 16 • A moving average of observed clock skew based on http response, with a dead-
17 zone of 0.5 seconds. Cross-domain requests must be enabled for this to work.

18

19 **Response information**

20 A detailed, access-by-access error log is provided with relevant information.

21 **2.3. Reference Client**

22 The reference client is a browser-based tool with a self-explanatory graphical user inter-
23 face. A drop-down menu can be used to select MPD URL of one of the test vectors. Alter-
24 natively, a custom URL can be provided in the URL box. A check box has to be used for
25 live content. Pressing the “Load” initiates the playback with playback controls visible on
26 the player screen. Statistics and logs are generated and displayed on the webpage.

27 **3. DASH264 Interoperability Conformance**

28 **3.1. General**

29 DASH264 Interoperability conformance is checked by an extension of the MPD Validator,
30 the Segment Validator specified in [2], and the Dynamic Service Conformance validator
31 to verify MPD conformance, Segment conformance, and timing aspects of dynamic ser-
32 vices, respectively.

3.2. MPD conformance

The MPD conformance checking and corresponding software modules are specified in [2]. The detailed MPD conformance checks are specified in Annex A of [2]. In addition to those checks, following DASH264 Interoperability rules [3] are checked:

1. Each Representation is provided in one of the following two ways:
 - a. as a single Segment, ...
 - b. as a sequence of Segments where each Segment is addressable by a template-generated URL.
2. The attribute MPD@maxSegmentDuration shall be present.
3. The Period.SegmentList element shall not be present.
4. If a Period contains multiple Adaptation Sets with value of the @contentType="video" then at least one Adaptation Set shall contain a Role element <Role scheme="urn:mpeg:dash:role:2011" value="main">
5. For any Adaptation Sets with value of the @contentType="video" the following attributes shall be present: ...@par
6. For Adaptation Set or for any Representation within an Adaptation Set with value of the @contentType="video" the attribute @scanType must not be present
7. For any Adaptation Sets with value of the @contentType="audio" the following attributes shall be present: @lang
8. For any Adaptation Sets with value of the @contentType="video" the following attributes shall be present: @maxWidth (or @width if all Representations have the same width), @maxHeight (or @height if all Representations have the same width), @maxFrameRate (or @frameRate if all Representations have the same width)
9. For any Representation within an Adaptation Set with value of the @contentType="video" the following attributes shall be present: @width, if not present in AdaptationSet element; @height, if not present in AdaptationSet element; @frameRate, if not present in AdaptationSet element; @sar
10. For Adaptation Set or for any Representation within an Adaptation Set with value of the @contentType="video" the attribute @scanType must not be present
11. For any Representation within an Adaptation Set with value of the @contentType="audio" the following elements and attributes shall be present: @audioSamplingRate, if not present in AdaptationSet element; AudioChannelConfiguration, if not present in AdaptationSet element

3.3. Segment Conformance

The Segment conformance rules and their hierarchy is specified in [2].

3.4. Profile Specific Conformance

The profile specific conformance rules for the profiles in [1] are is specified in [2]. In addition to those checks, following DASH264 Interoperability rules [3] are checked:

-
- 1 1. Representations shall comply with the formats defined in ISO/IEC 23009-1, section
2 7.3.
 - 3 2. In Media Segments, all Segment Index ('sidx') and Subsegment Index ('ssix')
4 boxes, if present, shall be placed before any Movie Fragment ('moof') boxes.
 - 5 3. If the MPD@type is equal to "static" and the MPD@profile attribute includes
6 "urn:mpeg:dash:profile:isoff-on-demand:2011", then
7 a. Each Representation shall have one Segment that complies with the Self-
8 Initializing Media Segment as defined in section 6.3.5.2 in ISO/IEC 23009-
9 1.
 - 10 4. If the MPD@type is equal to "dynamic" or if it includes MPD@profile attribute in-
11 cludes "urn:mpeg:dash:profile:isoff-live:2011", then
12 a. if the Media Segment is the last Media Segment in the Representation, this
13 Media Segment shall carry the 'lmsg' compatibility brand.

14 **3.5. Dynamic Service Conformance**

15 The conformance points for Dynamic services are:

- 16 1. Segment is made available latest by the Segment availability start time.
- 17 2. Segment remains available at least till the Segment availability end time.
- 18 3. MPD updates provide segment list updates as expected.

19 **3.6. Media Specific Conformance**

20 Media specific conformance is to be verified by the conformance software of the specific
21 media codec.

22 **3.7. DRM Specific Conformance**

23 In addition to segment and MPD conformance checks, following DRM-specific checks are
24 provided:

- 25 1. Every ContentProtection element must contain schemeldUri
- 26 2. For conformance test, the schemeUri must be one of:
27 a. 00000000-0000-0000-0000-000000000000
28 b. 00000000-0000-0000-0000-000000000001
29 c. 00000000-0000-0000-0000-000000000002
- 30 3. pssh box must be present in Movie or Movie Fragment Box
- 31 4. tenc box must be present one time in Movie or Movie Fragment Box

32 **4. DASH264 Reference Client**

33 **4.1. General**

34 dash.js is an initiative to establish a production quality framework for building video and
35 audio players that play back MPEG-DASH content using client-side JavaScript libraries

1 leveraging the Media Source Extensions API set as defined by the W3C. The core objec-
2 tives of this project are to build an open source Javascript library which

- 3 • Is codec agnostic
- 4 • Allows for multiple segment encapsulation types
- 5 • Allows for multiple content protection schema
- 6 • Allows for simple substitution of switching rules, loading methods and fail-
7 over/down logic

8 **4.2. Supported Features**

9 The initial implementation will build upon the aforementioned flexibility to produce a player
10 which matches the DASH264 recommendation of the DASH-IF, namely:

- 11 • Uses H.264 for video and HE-AAC for audio
- 12 • Base Media File Format segments
- 13 • urn:mpeg:dash:profile:isoff-on-demand:2011 and urn:mpeg:dash:profile:isoff-
14 live2011 profile support
- 15 • time-aligned, closed-GOP segments whose duration does not vary more than 25%
16 from the mean
- 17 • SMPTE-TT captioning
- 18 • CENC DRM support

Annex A

Access information

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A.1 General

The availability and access information of conformance and reference software modules is provided in Section A.2 and Section A.3, respectively.

A.2 DASH264 Conformance Software

A.2.1 DASH Conformance

This tool is available online at <http://dashif.org/conformance.html>. To get the source code of this tool, refer to Section A.2.3. The source code for the web front-end for this tool is located at: <https://github.com/Dash-Industry-Forum/Conformance-Software/>

A.2.2 Dynamic Service Conformance

This tool is available online at <http://dasher.eu5.org/Dynamic/>. Brief documentation is available here. To get the source code of this tool, refer to Section A.2.3.

A.2.3 Source Code

A.2.3.1 General

SVN access location of DASH264 conformance software is:

https://subversion.assembla.com/svn/DASH_Conformance

A.2.3.2 Read-Only Access

Use the following login credentials for read-only access:

User name: "dash_conformance"

Password: "dash_conformance"

(quotations excluded)

A.2.3.3 Read-Write Access

To have a read-write access to the repository, use one of the following two options:

1. Create a free account at www.assembla.com and request to be added to the DASH_Conformance space,
OR

1 2. Send an email to repository owner to be invited to the space.

2 **A.2.3.4 Usage Instructions**

3 For detailed usage instructions refer to the individual Readme files that come with the
4 software.

5

6 **A.3DASH264 Reference Client**

7 **A.3.1 General**

8 GitHub access location of DASH264 Reference Client software is:

9 <https://github.com/Dash-Industry-Forum/dash.js/>

10 The latest working version of the player can be found at:

11 <http://dashif.org/reference/players/javascript/index.html>

12

13 **A.3.2 Discussion Group**

14 This project communicates via the 'dashjs' Google group. To apply to join the email list, visit
15 <https://groups.google.com/d/forum/dashjs>

1

2 **5. References**

3 [1] ISO/IEC 23009-1:2014 Information technology -- Dynamic adaptive streaming over
4 HTTP (DASH) -- Part 1: Media presentation description and segment formats.

5 [2] ISO/IEC 23009-2:2014 Information technology -- Dynamic adaptive streaming over
6 HTTP (DASH) -- Part 2: Conformance and Reference Software.

7 [3] DASH Industry Forum, "Guidelines for Implementation: DASH264/AVC Interoperabil-
8 ity Points v2.0", see <http://dashif.org>.

9 [4] DASH Industry Forum, "Guidelines for Implementation: DASH264 Test Cases and vec-
10 tors v0.9", see <http://dashif.org>

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