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Fourth edition
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Information technology — Dynamic adaptive streaming over HTTP (DASH) —

Part 1: Media presentation description and segment formats

Technologies de l'information — Diffusion en flux adaptatif dynamique sur HTTP (DASH) —

Partie 1: Description de la présentation et formats de remise des médias

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Contents

Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

This fourth edition cancels and replaces the third edition (ISO/IEC 23009-1:2019), which has been technically revised. The main changes compared to the previous edition are as follows:

— the concept Service Description was added in order to enable signalling by the service provider on how the service is expected to be consumed;

— Initialization Sets, Groups and Presentations were added in order to simplify playback of Media Presentations across Period boundaries;

— leap second information was added to support the DASH Client in timing calculations when leap seconds occur;

— the producer reference time was added in order to allow signalling and mapping of media time to wall-clock time including the time of capture, encoding or other application defined context;

— the content popularity rate was added to indicate a level of popularity of the containing entity (i.e., the Adaptation Set, Representation or Preselection) within the Media Presentation;

— exact signalling and placement of content in a Period was added in order to simplify client operation in case of gaps and overlaps at Period boundaries;

— the concept of failover content was added in order to signal time sections in the Media Presentation or specific Representations that are not representing the main content, but a failover version for example in error cases;

— the support of the use of the Segment Timeline for low-latency DASH content was enabled;

— the concept of Preselections was extended in order to define conformance and playback rules for Representations from different Adaptation Sets within one Preselection; other clarifications on events were added;

— the ability to signal forced subtitles, easyreader and karaoke in the DASH Role scheme was added;

— a descriptor to indicate that the quality ranking associated to Representations is equivalent and comparable across Adaptation Sets was added;

— the ability that DASH inband events can be added to a Period with a presentation time offset avoiding the necessity to rewrite the event times in the media stream was added, as well as other clarifications on Events;

— a segment type that permits to signal that content is missing, but also provides sufficient information the media duration of the missing content was added;

— detailed recommendations and guidelines on how location and reference resolution for DASH resources, i.e. MPDs and Segments, can be performed based on information in the MPD and HTTP headers were added;

— DASH metrics were updated to support device information and to support specific keys for start and stop reasons.

A list of all parts in the ISO/IEC 23009 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Dynamic adaptive streaming over HTTP (DASH) is intended to support a media-streaming model for delivery of media content in which control lies primarily with the client. Clients may request data using the HTTP protocol from standard web servers that have no DASH-specific capabilities. Consequently, this document focuses not on client or server procedures but on the data formats used to provide a DASH Media Presentation.

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Information technology — Dynamic adaptive streaming over HTTP (DASH) — Part 1: Media presentation description and segment formats

1 Scope

This document primarily specifies formats for the Media Presentation Description and Segments for dynamic adaptive streaming delivery of MPEG media over HTTP. It is applicable to streaming services over the Internet.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 13818-1, *Information technology — Generic coding of moving pictures and associated audio information — Part 1: Systems*

ISO/IEC 14496-12:—[1], *Information technology — Coding of audio-visual objects — Part 12: ISO base media file format*

ISO/IEC 23091-3, *Information technology — Coding-independent code points — Part 3: Audio*

IETF RFC 1738, *Uniform Resource Locators*

IETF RFC 2397, *The "data" URL scheme*

IETF RFC 3629, *UTF-8, a transformation format of ISO 10646*

IETF RFC 3986:2005, *Uniform Resource Identifier* (*URI*)*: Generic Syntax*

IETF RFC 4122, *A Universally Unique IDentifier* (*UUID*) *URN Namespace*

IETF RFC 4337, *MIME Type Registration for MPEG-4*

IETF RFC 4648, *The Base16, Base32, and Base64 Data Encodings*

IETF RFC 5234, *Augmented BNF for Syntax Specifications: ABNF*

IETF RFC 5261, *An Extensible Markup Language* (*XML*) *Patch Operations Framework Utilizing XML Path Language* (*XPath*) *Selectors*

[1] 6th edition under preparation. Stage at time of publication: ISO/IEC FDIS 14496-12:2019.

IETF RFC 5646, *Tags for Identifying Languages*

IETF RFC 6381:2011, *The 'Codecs' and 'Profiles' Parameters for "Bucket" Media Types*

IETF RFC 6838:2013, *Media Type Specifications and Registration Procedures*

IETF RFC 7231:2014, *Hypertext Transfer Protocol* (*HTTP/1.1*)*: Semantics and Content*

IETF RFC 7233:2014, *Hypertext Transfer Protocol* (*HTTP/1.1*)*: Range Requests*

IETF RFC 8141:2017, *URN Syntax*

HTML 4.01 Specification, W3C Recommendation, 24 December 1999

W3C XML, Extensible Markup Language (XML) 1.0 (Fifth Edition), W3C Recommendation, 26 November 2008

W3C XLINK, XML Linking Language (XLink) Version 1.1, W3C Recommendation, 06 May 2010

W3C Media Fragments URI 1.0 (basic), W3C Recommendation, 25 September 2012

United States Code Title 47 CFR 79.103, Electronic Code of Federal Regulations: Closed caption decoder requirements for apparatus, *https://www.ecfr.gov/cgi-bin/text-idx?node=se47.4.79_1103*

SMPTE ST 2067-2, SMPTE Standard — Interoperable Master Format — Core Constraints

3 Terms, definitions, abbreviated terms and conventions

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1.1
access unit
unit of a *media stream* (3.1.29) with an assigned Media Presentation time

3.1.2
accessibility
degree to which a media content or certain *media content components* (3.1.22) are available to as many people as possible

3.1.3
Adaptation Set
set of interchangeable encoded versions of one or several *media content components* (3.1.22)

3.1.4
asset
content including media and metadata together with the rights to use the content by the content provider

3.1.5
associated Representation
Representation (3.1.38) which provides supplemental or descriptive information for at least one other Representation

3.1.6
available Segment
Segment (3.1.39) that is accessible at its assigned *HTTP-URL* (3.1.17) and a possibly assigned byte range that is the request with an HTTP GET results in a reply of the Segment and 2xx status code

3.1.7
Bitstream Switching Segment
Segment (3.1.39) that if present contains essential data to switch to the *Representation* (3.1.38) it is assigned to

3.1.8
complementary Representation
Representation (3.1.38) which complements at least one *dependent Representation* (3.1.12)

3.1.9
continuous media
media with an inherent notion of time

EXAMPLES Speech, audio, video, timed text or timed metadata.

3.1.10
DASH metric
metric computed by the DASH Client and uniquely identified by a key

3.1.11
data URL
URL with a fixed scheme "data"

3.1.12
dependent Representation
Representation (3.1.38) for which *Segments* (3.1.39) from its *complementary Representations* (3.1.8) are necessary for presentation and/or decoding of the contained *media content components* (3.1.22)

3.1.13
earliest presentation time
smallest *presentation time* (3.1.36) of any *access unit* (3.1.1) of a *Media Segment* (3.1.28) or *Subsegment* (3.1.49) for a *media stream* (3.1.29)

3.1.14
event
aperiodic sparse media-time related auxiliary information to the DASH Client or to an application

3.1.15
event stream
sequence of related *events* (3.1.14)

3.1.16
group
collection of *Adaptation Sets* (3.1.3) that are not expected to be presented simultaneously

3.1.17
HTTP-URL
URL with a fixed scheme of "http" or "https"

3.1.18
Index Segment
Segment (3.1.39) that primarily contains indexing information for *Media Segments* (3.1.28)

3.1.19
Initialization Segment
Segment (3.1.39) containing metadata that is necessary to present the *media streams* (3.1.29) encapsulated in *Media Segments* (3.1.28)

3.1.20
Main Adaptation Set
Adaptation Set (3.1.3) in a *Preselection* (3.1.35) that contains the *Initialization Segment* (3.1.19) for the complete experience

3.1.21
media content
single *media content period* (3.1.24) or contiguous sequence of media content periods

3.1.22
media content component
single continuous component of the *media content* (3.1.21) with an assigned *media content component type* (3.1.23)

3.1.23
media content component type
single type of *media content* (3.1.21)

EXAMPLES Audio, video, or text.

3.1.24
media content period
set of *media content components* (3.1.22) that have a common timeline as well as relationships on how they can be presented

3.1.25
Media Presentation
collection of data that establishes a bounded or unbounded presentation of *media content* (3.1.21)

3.1.26
Media Presentation Description
MPD
formalized description for a *Media Presentation* (3.1.25) for the purpose of providing a streaming service

3.1.27
Media Presentation timeline
concatenation of the timeline of all *Periods* (3.1.34) which itself is common to all *Representations* (3.1.38) in the Period

