
**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

ISO/IEC 23009-1:2019

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CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

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 third edition cancels and replaces the second edition (ISO/IEC 23009-1:2014), which has been technically revised. It also incorporates the Technical Corrigenda ISO/IEC 23009-1:2014/Cor.1:2015 and ISO/IEC 23009-1:2014/Cor.2:2015 and the Amendments ISO 23009-1:2014/Amd.1:2015, ISO 23009-1:2014/Amd.2:2015 and ISO 23009-1:2014/Amd.3:2016. The main changes compared to the previous edition are as follows:

- signaling a server timing source was added;
- the ability to label different structures with human readable identifiers was included;
- signaling of properly prepared media at Period boundaries for continuous playback across Periods was added;
- the concept of Preselections was added in order to combine different Adaptation Sets into a single decoding and user experience;
- the ability to offer segments which are not starting with SAP types 1 or 2, but still provide consistent random access and switching points on MPD level, including a new profile suitable for Broadcast TV, was added;
- MPD chaining to enable sequencing MPDs, for example to support pre-roll content to live services, was added;
- the ability to separate a long on-Demand Asset in multiple Periods, possibly including Periods with other content such as ads, was added;
- spatial Relationship Description was added to signal the logical combination of multiple Adaptation Sets into a single experience;

- the ability to add URL Parameters to HTTP requests in flexible and interoperable manner was included.

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.

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Introduction

Dynamic adaptive streaming over HTTP (DASH) is intended to support a media-streaming model for delivery of media content in which control lies exclusively 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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Electronics & Telecommunications Research Institute

161, Gajeong-dong, Yuseong-gu, Daejeon, Korea

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EMBLAZE LTD.

9 1-lamenofim Street

Herzeliya Pituach 46725, Israel P.O.Box 2216

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Sony Corporation

1-7-1 Knonan, Minato-Kyu, Tokyo, 108-0075

Intel Corporation

2200 Mission College Blvd., MS: RNB-4-150 Santa Clara, CA 95054

Koninklijke KPN N.V.

Maanplein 55, 2516 CK, The Hague, The Netherlands

Sharp Corporation

2613-1 Ichinomoto-cho, Tenri-shi, Nara Prefecture 632-8567, Japan

Huawei Technologies Co., Ltd

ISO/IEC 23009-1:2019(E)

Administration Building, Huawei Technologies Co., Ltd Bantian Longgang District
Shenzhen 518129, China

Samsung Electronics Co., Ltd
Maetan dong 129, Samsung-ro, Yeongtong-gu, Suwon-si,
Gyeonggi-do 443-742, Korea Republic

Fraunhofer-Gesellschaft
Hansastr. 27c
80686 München

Google Inc.
1600 Amphitheatre Parkway
Mountain View, CA 94043

Nokia Technologies Oy
Joensuukatu 7E, FIN-24100 Salo, Finland

Qualcomm Incorporated
5775 Morehouse Drive
San Diego, CA 92121

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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 23001-8, *Information technology — MPEG systems technologies — Part 8: Coding-independent code points*

<https://standards.iso.org/iso-iec-23009-1-2019>
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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*

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*

1) Under preparation. Stage at the time of publication: ISO/IEC/DIS 14496-12:2017. This document is technically identical to ISO/IEC 15944-12 (withdrawn).

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 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

3 Terms, definitions, symbols and abbreviated terms

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* (3.1.18) 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

bundle

set of media components which can be consumed jointly by a single decoder instance

3.1.9**complementary Representation**

Representation (3.1.38) which complements at least one *dependent Representation* (3.1.13)

3.1.10**continuous media**

media with an inherent notion of time

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

3.1.11**DASH metric**

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

3.1.12**data URL**

URL with a fixed scheme “data”

3.1.13**dependent Representation**

Representation (3.1.38) for which *Segments* (3.1.39) from its *complementary Representations* (3.1.9) are necessary for presentation and/or decoding of the contained *media content components* (3.1.22)

3.1.14**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)

3.1.15**event**

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

3.1.16**event stream**

sequence of related *events* (3.1.15)

3.1.17**group**

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

3.1.18**HTTP-URL**

URL with a fixed scheme of “http” or “https”

3.1.19**Index Segment**

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

3.1.20**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)

3.1.21**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](#))

EXAMPLE 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

3.1.28

Media Segment

Segment ([3.1.39](#)) that complies with media format in use and enables playback when combined with zero or more preceding Segments and an *Initialization Segment* ([3.1.20](#)) (if any)

3.1.29

media stream

encoded version of a *media content component* ([3.1.22](#))

3.1.30

Media Subsegment

Subsegment ([3.1.49](#)) that only contains media data but no *Segment Index* ([3.1.43](#))

3.1.31

message

part of an *event* ([3.1.15](#)) containing information that is exclusively handled by the event handler

3.1.32

MPD start time

approximate presentation start time of a *Media Segment* ([3.1.28](#)) signalled in *MPD* ([3.1.26](#))

3.1.33

MPD duration

approximate presentation duration of a *Media Segment* ([3.1.28](#)) signalled in *MPD* ([3.1.26](#))

3.1.34

Period

interval of the *Media Presentation* ([3.1.25](#)), where a contiguous sequence of all Periods constitutes the Media Presentation

3.1.35

Preselection

subset of media component in a *bundle* ([3.1.8](#)) that are expected to be consumed jointly