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**Digital Video Broadcasting (DVB);
MPEG-DASH Profile for Transport of ISO BMFF
Based DVB Services over IP Based Networks**

Standard PREVIEW
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EBU DVB[®]



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Foreword

This Technical Specification (TS) has been produced by Joint Technical Committee (JTC) Broadcast of the European Broadcasting Union (EBU), Comité Européen de Normalisation ELECTrotechnique (CENELEC) and the European Telecommunications Standards Institute (ETSI).

NOTE: The EBU/ETSI JTC Broadcast was established in 1990 to co-ordinate the drafting of standards in the specific field of broadcasting and related fields. Since 1995 the JTC Broadcast became a tripartite body by including in the Memorandum of Understanding also CENELEC, which is responsible for the standardization of radio and television receivers. The EBU is a professional association of broadcasting organizations whose work includes the co-ordination of its members' activities in the technical, legal, programme-making and programme-exchange domains. The EBU has active members in about 60 countries in the European broadcasting area; its headquarters is in Geneva.

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The Digital Video Broadcasting Project (DVB) is an industry-led consortium of broadcasters, manufacturers, network operators, software developers, regulatory bodies, content owners and others committed to designing global standards for the delivery of digital television and data services. DVB fosters market driven solutions that meet the needs and economic circumstances of broadcast industry stakeholders and consumers. DVB standards cover all aspects of digital television from transmission through interfacing, conditional access and interactivity for digital video, audio and data. The consortium came together in 1993 to provide global standardisation, interoperability and future proof specifications.

Modal verbs terminology

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1 Scope

The present document defines the delivery of TV content via HTTP adaptive streaming building on the MPEG DASH specification [1]. In order to improve interoperability, additional constraints and requirements are defined and a selection of the video and audio codecs from the DVB toolbox are referenced that are technically appropriate for use with MPEG DASH. The present document includes High Definition Television (HDTV), Ultra High Definition Television (UHDTV), High Dynamic Range (HDR) Television, High Frame Rate (HFR) Video and Next Generation Audio (NGA). It also defines how to achieve low latency delivery and presentation of content.

The normative XML schemas referenced by the present document are attached as separate files contained in archive ts_103285v010301p0.zip which accompanies the present document. The XML schemas included in the present document are informative.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <https://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

- [1] ISO/IEC 23009-1:2019: "Information technology -- Dynamic adaptive streaming over HTTP (DASH) -- Part 1: Media presentation description and segment formats".
- [2] ISO/IEC TR 23009-3: "Information technology -- Dynamic adaptive streaming over HTTP (DASH) -- Part 3: Implementation guidelines".
- [3] ETSI TS 101 154: "Digital Video Broadcasting (DVB); Specification for the use of Video and Audio Coding in Broadcast and Broadband Applications".

NOTE: The present document references text that was introduced in ETSI TS 101 154 with version 2.4.1.

- [4] ISO/IEC 14496-15:2017: "Information technology -- Coding of audio-visual objects -- Part 15: Carriage of network abstraction layer (NAL) unit structured video in ISO base media file format".
- [5] IETF RFC 6381: "The 'Codecs' and 'Profiles' Parameters for "Bucket" Media Types".
- [6] ISO/IEC 14496-12:2015: "Information technology -- Coding of audio-visual objects -- Part 12: ISO base media file format".
- [7] ISO/IEC 23001-7:2016: "Information technology -- MPEG systems technologies -- Part 7: Common encryption in ISO base media file format files".
- [8] ISO/IEC 14496-3:2009/Amd 4:2013: "New levels for AAC profiles".
- [9] ISO/IEC 14496-14: "Information technology -- Coding of audio-visual objects -- Part 14: MP4 file format".
- [10] ETSI TS 102 366: "Digital Audio Compression (AC-3, Enhanced AC-3) Standard".
- [11] ETSI TS 102 114: "DTS Coherent Acoustics; Core and Extensions with Additional Profiles".

- [12] ISO/IEC 23003-1:2007: "Information technology -- MPEG audio technologies -- Part 1: MPEG Surround".
- [13] EBU Tech 3380: "EBU-TT-D Subtitling Distribution Format".
- [14] EBU Tech 3381: "Carriage of EBU-TT-D in ISO BMFF".
- [15] ETSI EN 300 468: "Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems".
- [16] ETSI ES 202 184: "MHEG-5 Broadcast Profile".
- [17] IETF RFC 7230: "Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing".
- [18] IETF RFC 6265: "HTTP State Management Mechanism".
- [19] ISO/IEC 14496-30: "Information technology -- Coding of audio-visual objects -- Part 30: Timed text and other visual overlays in ISO base media file format".
- [20] ISO/IEC 14496-22:2009: "Information technology -- Coding of audio-visual objects -- Part 22: Open Font Format".
- [21] Recommendation ITU-R BT.709: "Parameter values for the HDTV standards for production and international programme exchange".
- [22] W3C Recommendation (December 2012): "WOFF File Format 1.0".
- NOTE: Available at <http://www.w3.org/TR/WOFF>.
- [23] ETSI TS 103 190-1: "Digital Audio Compression (AC-4) Standard; Part 1: Channel based coding".
- [24] IETF RFC 2782: "A DNS RR for specifying the location of services (DNS SRV)".
- [25] Void.
- [26] W3C Recommendation (November 2008): "Extensible Markup Language (XML) 1.0".
- NOTE: Available at <http://www.w3.org/TR/REC-xml/>.
- [27] W3C Recommendation (September 2012): "Media Fragments URI 1.0".
- NOTE: Available at: <http://www.w3.org/TR/media-frags/>.
- [28] IETF RFC 5234: "Augmented BNF for Syntax Specifications: ABNF".
- [29] ISO 8601-1:2004: " Date and time -- Representations for information interchange -- Part 1: Basic rules".
- NOTE: Available at <https://www.iso.org/obp/ui/#iso:std:iso:8601:-1:ed-1:v1:en>.
- [30] Void.
- [31] ETSI TS 102 809: "Digital Video Broadcasting (DVB); Signalling and carriage of interactive applications and services in Hybrid broadcast/broadband environments".
- [32] ETSI TS 101 499 (V3.1.1): "Hybrid Digital Radio (DAB, DRM, RadioDNS); SlideShow; User Application Specification".
- [33] ETSI TS 103 190-2: "Digital Audio Compression (AC-4) Standard; Part 2: Immersive and personalized audio".
- [34] ISO/IEC 23008-3:2019: "Information technology -- High efficiency coding and media delivery in heterogeneous environments -- Part 3: 3D audio".
- [35] Void.

- [36] ISO/IEC 23001-8:2016: "Information technology -- MPEG systems technologies -- Part 8: Coding-independent code points".
- [37] ISO/IEC 23003-3:2012: "Information technology -- MPEG audio technologies -- Part 3: Unified speech and audio coding".
- [38] Recommendation ITU-R BT.2020: "Parameter values for ultra-high definition television systems for production and international programme exchange".
- [39] Recommendation ITU-R BT.2100: "Image parameter values for high dynamic range television for use in production and international programme exchange".
- [40] ISO/IEC 23000-19:2019/FDIS: "Information technology -- Multimedia application format (MPEG-A) -- Part 19: Common media application format (CMAF) for segmented media (2nd edition)".
- [41] ETSI TS 102 822-3-1 (V1.9.2): "Broadcast and On-line Services: Search, select, and rightful use of content on personal storage systems ("TV-Anytime"); Part 3: Metadata; Sub-part 1: Phase 1 - Metadata schemas".
- [42] ETSI TS 103 491: "DTS-UHD Audio Format; Delivery of Channels, Objects and Ambisonic Sound Fields".
- [43] IETF RFC 7231: "Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] DASH-IF: "Guidelines for Implementation: DASH-IF Interoperability Points V3.0".

NOTE: Available at <http://dashif.org/guidelines/>.

- [i.2] Void.

- [i.3] Recommendation ITU-T T.35: "Procedure for the allocation of ITU-T defined codes for non-standard facilities".

- [i.4] TTML Media Type Definition and Profile Registry.

NOTE: Available at <https://www.w3.org/TR/ttml-profile-registry/>.

- [i.5] W3C Recommendation 17 November 2016: "Media Source Extensions".

- [i.6] Recommendation ITU-T H.265/ISO/IEC 23008-2: "Information technology - High efficiency coding and media delivery in heterogeneous environments - Part 2: High efficiency video coding".

- [i.7] Abdelhak Bentaleb, Christian Timmerer, Ali C. Begen and Roger Zimmermann: "Bandwidth prediction in low-latency chunked streaming", in Proc. ACM NOSSDAV, Amherst, MA, June 2019 (DOI=10.1145/3304112.3325611).

NOTE: Available at <https://doi.org/10.1145/3304112.3325611>.

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the following terms apply:

access unit: unit of a media stream with an assigned Media Presentation time

accessibility: degree to which a media content or certain media content components are available to as many people as possible

adaptation set: set of interchangeable encoded versions of one or several media content components

adjusted segment availability start time: time instant in wall-clock time at which a Segment becomes an available Segment

application: collection of assets and logic that together provide a self-contained interactive service to the user

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

audio bundle: set of audio programme components that contribute to the playout of one next generation audio decoder

audio preselection: set of audio programme components representing a version of the Programme that may be selected by a user for simultaneous decoding

NOTE: An audio Preselection is a sub-selection from all available audio programme components of one Programme. An audio Preselection may be considered the NGA equivalent of audio services in predecessor systems, whereby each audio service comprises a complete audio mix.

audio programme component: smallest addressable unit of the audio components of a Programme

available segment: segment that is accessible at its assigned HTTP-URL with optionally an assigned byte range that when requested with an HTTP GET results in a reply with the Segment and a 2xx status code

auxiliary NGA stream: NGA stream delivered using NGA multi-stream delivery, and containing additional audio programme components not contained in the main NGA stream

bitstream switching segment: segment that if present contains essential data to switch to the Representation it is assigned to

content protection: protection of content such that it can only be presented by authorized Devices

content provider: entity that owns or is licensed to sell content or content assets

continuous media: media with an inherent notion of time, for example, speech, audio, video, timed text or timed metadata

DASH metric: metric identified by a key and defined in ISO/IEC 23009-1 [1]

decoder specific information: decoder configuration record

default audio Preselection: audio Preselection including all audio programme components to be decoded when a player is unable to select from the available Preselections

earliest presentation time: smallest presentation time of any access unit of a Media Segment or Subsegment for a media stream

event: aperiodic sparse media-time related auxiliary information to the DASH client or to an application

event stream: sequence of related events

group: collection of Adaptation Sets that are not expected to be presented simultaneously

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