



Commercial Requirements for the Use of Common Media Client Data in DVB-I

DVB Document C109

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DVB[®]

Intellectual Property Rights

Please refer to the IPR policy of DVB Project available at: <https://dvb.org/about/policies-procedures/>

Foreword

DVB is an industry-led consortium of broadcasters, manufacturers, network operators, software developers, regulators and others from around the world committed to designing open, interoperable technical specifications for the global delivery of digital media and broadcast services. DVB specifications cover all aspects of digital television from transmission through interfacing, conditional access and interactivity for digital video, audio and data. DVB dominates the digital broadcasting environment with thousands of broadcast services around the world using DVB specifications. There are hundreds of manufacturers offering DVB-compliant equipment. To date, there are over 1 billion DVB receivers shipped worldwide.

Executive summary

Common Media Client Data (CMCD) from CTA enables an OTT media player to provide information about playback that can be used for optimisation and fault finding. DVB is enabling broadcasters and other providers of DVB-I linear services to use this technology to improve the delivery of their services to consumers.

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1. Introduction

1.1. General

Common Media Client Data (CMCD, [CTA 5004](#) [1]) defines communication from a media player in a client device to a CDN. Some of the features can be described as follows.

- Media player clients can convey information to Content Delivery Networks (CDNs) with each object request. This information can be useful in log analysis, QoS monitoring and delivery optimization.
 - Session identification allows thousands of individual server log lines to be interpreted as a single user session, leading to a clearer picture of end-user quality of service.
 - Bitrate, buffer and segment signalling allow CDNs to fine-tune and optimize their midgress traffic by intelligently reacting to the time constraints implicit in each request.
 - Prefetch hints allow CDNs to have content ready at the edge ahead of the client request, improving delivery performance.
 - Buffer starvation flags allow performance problems across a multi-CDN delivery surface to be identified in real-time.
- In combination, this transferred data should improve the quality of service offered by CDNs, which in turn will improve the quality of experience enjoyed by consumers.
- Common Data metrics for different protocols and players are defined.

CMCD is a simple, focussed specification created after more complex specifications (e.g. CTA-2066) failed to get industry acceptance. In addition, the metrics reporting mechanisms defined in TS 103 285 (DVB-DASH) also failed to get significant adoption as the current solution introduces additional request overhead, which can be costly and inefficient. In CMCD reporting metrics are integrated with the requests that are already made by a player, which is more efficient.

1.2. Scope

The scope of this document is to enable the optional use of CMCD with DVB-I services presented by the ‘native’ DASH player, i.e. the one built-in to a DVB-I client.

1.3. Background on market adoption of CMCD

CMCD was published in September 2020. It has been adopted by leading OTT media player libraries including those listed below.

- DASH.js - <https://github.com/Dash-Industry-Forum/dash.js/issues/3176> and <https://reference.dashif.org/dash.js/v4.0.0/samples/advanced/cmcd.html>
- HLS.js - <https://github.com/video-dev/hls.js/blob/master/docs/API.md#cmcd>
- Shaka - <https://github.com/shaka-project/shaka-player/issues/3619>
- Exoplayer - <https://github.com/google/ExoPlayer/issues/8699>
- THEOplayer - <https://github.com/THEOplayer/theoplayer-common-media-client-data>
- Bitmovin - <https://community.bitmovin.com/t/cmcd-support-with-bitmovin-player-web-sdk-beta/1960>

CMCD has been adopted by CDNs including those listed below.

- Akamai (who drove creation of CMCD) - <https://techdocs.akamai.com/adaptive-media-delivery/docs/common-media-client-data-amd>
- Amazon Cloudfront - <https://aws.amazon.com/blogs/networking-and-content-delivery/improving-video-observability-with-cmcd-and-cloudfront/>
- Google Cloud / Media CDN - <https://cloud.google.com/blog/products/networking/benefits-of-building-media-services-on-google-cloud> and <https://cloud.google.com/media-cdn/docs/monitor>
- Fastly - <https://www.fastly.com/blog/video-cache-prefetch-with-compute-edge>

Additionally, several DVB members who offer CDN services have confirmed that CMCD is included in their market offerings.

1.4. Supplementary technical material on CMCD

A selection of additional material on CMCD:

- CMCD presentation at Mile High Video conference 2022
William Law and Sean McCarthy. 2022. CMCD at work with real-time, real-world data. In Proceedings of the 1st Mile-High Video Conference (MHV '22).
<https://dl.acm.org/doi/abs/10.1145/3510450.3517268>
- Tie together your client and CDN logs using Mux Data with CMCD
<http://web.archive.org/web/20231001030230/https://www.mux.com/blog/tie-together-your-client-and-cdn-logs-using-mux-data-with-cmcd>
How Common Media Client Data (CMCD) Transforms Streaming Monitoring & Analysis
<http://web.archive.org/web/20240422201022/https://blog.touchstream.media/how-common-media-client-data-transforms-streaming-monitoring-analysis>
- Overview of CMCD and practical implementation/evaluation: A. C. Begen, A. Bentaleb, D. Silhavy, S. Pham, R. Zimmermann and W. Law, "Road to Salvation: Streaming Clients and Content Delivery Networks Working Together," in IEEE Communications Magazine, vol. 59, no. 11, pp. 123-128

2. References

References are either specific (identified by date of publication and/or edition number or version number) or nonspecific. 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, DVB cannot guarantee their long-term validity.

[1]	CTA 5004	Web Application Video Ecosystem - Common Media Client Data (CTA-5004) https://shop.cta.tech/products/web-application-video-ecosystem-common-media-client-data-cta-5004
[2]	ETSI TS 103 285	Digital Video Broadcasting (DVB); MPEG-DASH Profile for Transport of ISO BMFF Based DVB Services over IP Based Networks
[3]	ETSI TS 103 777	Digital Video Broadcasting (DVB); Service Discovery and Programme Metadata for DVB-I

3. Definitions and conventions

3.1. Terms

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

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3.2. Abbreviations

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

CMCD	Common Media Client Data
CDN	Content Delivery Network
DVB TM	DVB Technical Module
DVB CM	DVB Commercial Module
DVB CM-I	DVB Commercial Module – Internet ad-hoc group
FDIS	Final Draft International Standard

3.3. Conventions

Commercial Requirement tagging scheme:

Req x. [y].z.	Name	Status	Priority	Use case
<p>Numeric requirement ref.</p> <p>x = section y = subsection(s) z = sequence number</p> <p>This is a unique id within the document that could be used to refer to a requirement within a specific version of this document.</p> <p>Note that this id. is not strictly coupled to the particular requirement, could vary across different versions of this document</p>		<p>This status field can have the following states:</p> <p>Draft = work in progress</p> <p>Complete = completed and agreed in task force</p> <p>Agreed = agreed within CM-I</p> <p>Accepted = accepted by CM</p>	<p>This field is the associated priority set by the CM to the requirement.</p> <p>1 → Must have</p> <p>2 → Recommended to have</p> <p>3 → Nice to have</p>	<p>Identifies the use cases that relate to this commercial requirement, if applicable.</p> <p>[UC]</p>

For the purpose of this document, the following normative conventions are used in the Commercial Requirements text:

Convention	Meaning
shall enable	The functionality shall be specified but its support is optional.
shall support	The functionality shall be specified and its support is mandatory.
should enable	The functionality is recommended to be specified and its support is optional.

should support	The functionality is recommended to be specified and supported.
may enable	The functionality may be specified and if it is then its support is optional, and it shall not have any weight in the selection or exclusion of any particular solution.
may support	The functionality may be specified and if it is then its support is recommended but it shall not have any weight in the selection or exclusion of any particular solution.
shall not preclude	The functionality shall not be prevented.
should not preclude	It is recommended not to prevent the functionality.

4. Commercial requirements

4.1. Technology requirements

Req 4.1-1	Support for CMCD Information	Accepted	1	
<p>DVB specifications shall provide a mechanism and guidelines to allow a DVB-I client, should it so choose, to include CMCD information in network requests according to CTA-5004 [1].</p> <p>Note: The DVB TM should also ensure that any CMCD signalling does not impact multicast-based delivery systems.</p>				

Req 4.1-2	Support for CMCD Information	Accepted	1	
<p>DVB specifications shall provide a mechanism and guidelines to allow a DVB-DASH player, should it so choose, to include CMCD information in network requests according to CTA-5004 [1].</p>				

4.2. Timeline requirements

Req 4.2-1	Relationship to MPEG publication	Accepted	1	
<p>Publication of a DVB Bluebook for DVB-DASH need not wait for final publication of an MPEG standard including CMCD. An FDIS is sufficient.</p>				

4.3. V&V requirements

Req 4.3-1	Reference implementation of a DVB-DASH client	Accepted	1	
<p>The DVB TM is requested to provide a reference implementation of CMCD in a DVB-I client. This could be fulfilled by a reference to an existing implementation.</p> <p>Note: this could be an extension to an existing DASH client such as dash.js.</p>				

Req 4.3-2	Validator for CMCD	Accepted	1	
The DVB TM is requested to provide a tool to validate the correct behaviour of a client-side CMCD implementation according to the DVB specifications.				

5. Expected technical work

5.1. Impact on existing specifications or need for new ones

The following specifications may need to be updated to fulfil the requirements set out in this document:

- ETSI TS 103 285 (DVB-DASH) [2]
- ETSI TS 103 770 (DVB-I) [3]

V&V requirements may be addressed in co-operation with external organisations.

6. Annex: Use cases (informative)

6.1. Use case 1: Optimising choice of CDN in multi-CDN deployments

Use Case Title	Optimising choice of CDN in multi-CDN deployments
Submitter	-
Supporters	-
Description	A broadcaster is using multiple CDNs. It wants to be able to decide on the best CDN for different groups of end-users and needs data to support these decisions. It needs to be able to update that decision making logic over time as things change.
Pre-Conditions	Even though this is not personal data, broadcasters may prefer to obtain consent before doing this.
Extracted draft commercial requirements	1. -

6.2. Use case 2: Detection and demediation of re-buffering

Use Case Title	Detection and demediation of re-buffering
Submitter	-
Supporters	-
Description	A broadcaster wants to be notified if end-users are seeing re-buffering and to have sufficient information to investigate and to take remedial action. Part of the

	investigation would be to cross-reference client-side data and server-side data to help identify where the root cause lies.
Pre-Conditions	Even though this is not personal data, broadcasters may prefer to obtain consent before doing this.
Extracted draft commercial requirements	1. -

6.3. Use case 3: Detection and demediation of re-buffering

Use Case Title	Detection and demediation of re-buffering
Submitter	-
Supporters	-
Description	A broadcaster wants to be able to tell how many end-users are using which DASH Representations, e.g. how many are using the best quality bitrate available. Examples of what this data could be used for include modifying the set of Representations that are being encoded and/or modifying which CDN is used for particular groups of end-users.
Pre-Conditions	Even though this is not personal data, broadcasters may prefer to obtain consent before doing this.
Extracted draft commercial requirements	2. -

6.4. Use case 4: Enabling optimising / improving and debugging service delivery

Use Case Title	Enabling optimising / improving and debugging service delivery
Submitter	-
Supporters	-
Description	A manufacturer wants end-users to have a good high quality reliable experience with their new TV feature of DVB-I services. It wants broadcasters to have the data needed for optimising/improving the regular routine delivery of the service and to detect and resolve problems before users have complained.
Pre-Conditions	-
Extracted draft commercial requirements	3. -

6.5. Use case 5: Enabling optimising / improving and debugging service delivery

Use Case Title	Enabling optimising / improving and debugging service delivery
Submitter	-
Supporters	-
Description	A CDN provider/operator wants to correlate traffic data, cache response time, hit/miss ratio, and network-related traces with playback sessions metrics provided by one or more clients in order to optimize network resources allocation (statically and dynamically) and ensure a higher, consistent level of quality of experience to end users.
Pre-Conditions	-
Extracted draft commercial requirements	4. -

7. History

Version	Date	[Milestone]
C109	9 July 2024	First BlueBook publication (Internal document CM2310)