**3GPP TSG-SA4 Meeting #-MBS SWG AHS4aI250145**

**Paris, France, 3rd Sep 2025 - 5th Sep 2025 revision of S4aI250137**

**Source: Qualcomm Incorporated**

**Title: [AMD\_PRO-MED] co-CR to** **26512-0089r6 on Inband Configuration**

**Spec: 3GPP TS 26.512**

**Agenda item: 7**

**Document for: Decision**

**1. Introduction**

S4aI250108 implements basically all relevant features, but lists on the cover page the following.

Still to do, based on section 4 of Discussion Paper S4-251317:

1. Possibly a “detailed DASH instantiation” of the generic in-band client reporting procedure at M4 specified in clause 10.5.
2. Specify syntax of the Media Player client API for metrics reporting configuration, i.e., the **metrics configuration object** in table 13.2.4-2.
   * (This needs to be suitably generic to cater for all metrics reporting schemes: both Rel-16 ones at M5 as well as Rel-19 in-band client data reporting at M4.)

We agree that choice of reporting mode (HTTP request headers or URL query parameters) is driven by client API or 3GPP Service URL at reference point M6/M11, which takes precedence over any value signalled in the DASH MPD. There is no third way to provision this via M1+M5 in this release.

This co-CR provides proposals for 1 and 2 above.

**2. Reason for Change**

Some notes ask for addressing this issue.

**3. Conclusions**

We would be done

**4. Proposal**

It is proposed to agree the attached changes to the CR 26512-0089r3.

**5. Revision**

|  |  |  |  |
| --- | --- | --- | --- |
| [**S4aI250137**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_MBS/Docs/S4aI250137.zip) | [AMD\_PRO-MED] co-CR to 26512-0089r3 on Inband Configuration | Qualcomm Germany | Thomas Stockhammer |

**E-mail Discussion**: none

**Revisions**:

* <https://www.3gpp.org/ftp/tsg_sa/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_MBS/Inbox/Drafts/S4aI250137_BBC.docx>

**Presenter**: Thomas Stockhammer

**Online Discussion**: (September 3/4/5 2025)

Richard: example shows inband configuration. The context is missing in general description, that describe how to configure inband. On the example, in the case the inband configuration is done, where the CMCD reporting go back to?

Thomas: it is attached to the media request. The naeurl needs to be 5gms location. So we agree on improved wording and updating the example.

Thomas: since we have client quality reporting in 26.247, do we need to refer to that one in Annex G?

Richard: Quality reporting is separate. The G5 title should be inband reporting.

Richard: we can use the first change, for m7 API.

**Decision**:

[S4aI250137](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_MBS/Docs/S4aI250137.zip) is **revised to 145 and agreed**

Media Streaming (M4) accepted change from 108

## 10.5 In-band client data reporting

### 10.5.1 CMCD-based client data reporting

If one or more of the CMCD metrics schemes specified in table 7.8.1‑1 is indicated in the client metrics reporting configurations provided to the Media Session Handler, the corresponding class(es) of CMCD information shall be collected by the Media Player and reported to the 5GMSd AS at reference point M4d per [CMCDv1]. In addition:

- The currently effective Media Player Entry may restrict the subset of Service Locations and/or media object types for which CMCD information is reported. These are honoured by the Media Player.

- The Media Player shall include in every CMCD report the current media delivery session identifier in the sessionId property of the MetricsSession (see clause 9.5.3.2 of TS 26.510 [56]). If the currently effective Media Player Entry declares a session identifier of its own for the purpose of client data reporting, this is typically used to populate the CMCD sid key (e.g., as required by clauses K.3.7 and K.4.2.7 of ISO/IEC 23009-1 [32]); otherwise, this key shall be populated with the current media delivery session identifier.

- If available in its configuration (i.e., if provided via the configuration and settings API specified in clause 13.2.4 or via the relevant query parameter of the 3GPP Service URL specified in clause 12.4, as applicable), the Media Player shall include in every CMCD report the content identifier of the media streaming asset being consumed in the contentId property of the MetricsSession (see clause 9.5.3.2 of TS 26.510 [56]). If the currently effective Media Player Entry declares a content identifier of its own for the purpose of client data reporting, this is typically used to populate the CMCD cid key (e.g., as required by clauses K.3.7 and K.4.2.7 of ISO/IEC 23009-1 [32]); otherwise, this key shall be populated with the current content identifier in the Media Player’s configuration, if available.

- If both the metricsConfiguration[ ] and the cmcdReporting are present in the configuration and settings API specified in clause 13.2.4 and they configure different metrics, then the Media Player shall report the union of the two.

- If the Media Session Handler populates both metricsConfiguration[ ] and the cmcdReporting in the configuration and settings API, and it sets the value of the sid and/or the cid, the values shall be identical. If the values are not identical, the values provided in the cmcdReporting shall take precedence.

- The Media Player Entry may explicitly specify a set of CMCD keys to be reported (e.g., as required by clauses K.3.7 and K.4.2.7 of ISO/IEC 23009-1 [32]). These are typically reported by the Media Player in addition to those configured in the currently effective client metrics reporting configuration.

- The use by the Media Player of HTTP request headers or URL query parameters to report CMCD information is governed by the configuration and settings API specified in clause 13.2.4 or by the relevant query parameter of the 3GPP Service URL specified in clause 12.4 (as applicable). This value shall take precedence over any client data reporting mode indicated in the currently effective Media Player Entry.

- A Media Player supporting CMCD metrics may implement the collection and reporting of all metrics defined in CMCD or only a subset. In the context of the present document, a Media Player shall support at least the sid key.

I NOTE: Section 3.1 of the CMCD specification [CMCDv1] recommends that HTTP request headers and URL query parameters are sent in alphabetical order of key name when transmitted. This reduces the fingerprinting surface exposed by the Media Player.

Clause G.5 specifies how to instantiate CMCD-based client data reporting in DASH.

\* \* \* Next Change \* \* \* \*

### 13.2.4 Configurations and settings API

DASH streaming for a particular downlink media delivery session may be configured by the 5GMSd-Aware Application at reference point M7d or by the Media Session Handler at reference point M11d with the parameters provided in table 13.2.4-1. Note that these parameters may be set and they may also be observed.

Table 13.2.4-1: Media Player Configuration API

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Status | | | Type | Definition |
| sessionId | | | string | A media delivery session identifier for the downlink media streaming session that has been initialised using the method specified in clause 13.2.3.2. |
| source | | | Object | Provides the MPD and all contained information. |
| consumptionMode | | | Enum | Defines two modes:  live: in this case the target latency is maintained, if specified in the service description, according to the parameters  vod: in this case the latency is set by the application, and the latency settings are ignored. |
| maxBufferTime | | | Integer | Maximum buffer time in milliseconds for the service. |
| serviceDescriptionId | | | id | Selects a service description by selecting an identifier. |
| serviceDescriptions[] | | | Service description parameters | Configures a service description as defined in annex K of ISO/IEC 23009-1 [32]. This allows the application to define additional service descriptions beyond those defined in the MPD. |
|  | id | | id | Sets a service description identifier different from the ones available in the service descriptions in the MPD or modifies existing service descriptions. |
|  | serviceLatency | | Object | Sets service description parameters for the service latency, as defined in table K.3.1-1 of ISO/IEC 23009-1 [32]. |
|  | playBackRate | | Object | Sets service description parameters for the playback rate, as defined in table K.3.2-1 of ISO/IEC 23009-1 [32] when the service is consumed in live mode. |
|  | operatingQuality | | Object | Sets service description parameters for the operating quality, as defined in table K.3.4-1 of ISO/IEC 23009-1 [32]. |
|  | operatingBandwidth | | Object | Sets service description parameters for the operating bandwidth, as defined in table K.3.5-1 of ISO/IEC 23009-1 [32]. |
|  | clientDataReporting | | Object | Sets service description parameters for client data reporting as defined in table K.3.7-1 of ISO/IEC 23009-1 [32]. |
|  |  | cmcdReporting | Object | Sets service description parameters for the CMCD reporting scheme as defined in table K.3.7-2 of ISO/IEC 23009-1 [32].  These parameter values shall take precedence over the equivalent value specified in the selected Media Entry Point. |
| mediaSettings[] | | | Media type audio, video, subtitle | Sets the selected Adaptation Set based on the available Adaptation Sets for each media type. |
| metricsConfiguration[ ] | | | Object | Zero or more sets of settings for collecting metrics in relation to the downlink media streaming session. |

### 13.2.5 Notifications and error events

Table 13.2.5-1 provides a list of notification events that are provided by the Media Player to 5GMSd-Aware Applications at reference point M7d and to the Media Session Handler at reference point M11d. Every notification and error event is disambiguated by a media delivery session identifier.

Table 13.2.5-1: Media Player Notification events

|  |  |  |
| --- | --- | --- |
| Status | Definition | Payload |
| AST\_IN\_FUTURE | Triggered when playback will not start yet as the MPD's availabilityStartTime is in the future. | Media delivery session identifier, Time before playback will start. |
| AVAILABLE\_MEDIA\_CHANGED | The list of available media has changed. | Media delivery session identifier, Media type:  - video  - audio  - subtitle  - all |
| BUFFER\_EMPTY | Triggered when the media playback platform's buffer state changes to stalled. | Media delivery session identifier, Media Type |
| BUFFER\_LOADED | Triggered when the media playback platform's buffer state changes to loaded. | Media delivery session identifier, Media Type |
| CAN\_PLAY | Sent when enough data is available that the media can be played. | Media delivery session identifier |
| *CMCD\_DATA\_GENERATED* | Triggered when CMCD data was generated for a HTTP request | Media delivery session identifier |
| MANIFEST\_LOADED | Triggered when the manifest load is complete | Media delivery session identifier |
| METRIC\_ADDED | Triggered every time a new metric is added. | Media delivery session identifier |
| METRIC\_CHANGED | Triggered every time a metric value changes. | Media delivery session identifier,  Metric identifier |
| METRIC\_UPDATED | Triggered when the configuration of a metric is updated. | Media delivery session identifier,  Metric identifier |
| METRICS\_CHANGED | Triggered whenever there is a change to the overall metrics. | Media delivery session identifier |
| OPERATION\_POINT\_CHANGED | Triggered whenever there is a change of a Service Operation Point parameter. | Media delivery session identifier,  External reference identifier of currently selected Service Operation Point. |
| PLAYBACK\_ENDED | Sent when media playback completes normally. | Media delivery session identifier |
| PLAYBACK\_ERROR | Sent when an error occurs during media playback. The element's error attribute contains more information. | Media delivery session identifier,  Error reason (see table 13.2.5‑2). |
| PLAYBACK\_PAUSED | Sent when media playback is paused. | Media delivery session identifier |
| PLAYBACK\_PLAYING | Sent when the media begins to play (either for the first time, after having been paused, or after ending and then restarting). | Media delivery session identifier |
| PLAYBACK\_SEEKED | Sent when a media playback seek operation completes. | Media delivery session identifier |
| PLAYBACK\_SEEKING | Sent when a media playback seek operation begins. | Media delivery session identifier |
| PLAYBACK\_STALLED | Sent when the media playback platform reports stalled. | Media delivery session identifier |
| PLAYBACK\_STARTED | Sent when playback of the media starts after having been paused; that is, when playback is resumed after a prior pause event. | Media delivery session identifier |
| PLAYBACK\_WAITING | Sent when the media playback has stopped because of a temporary lack of data. | Media delivery session identifier |
| SERVICE\_DESCRIPTION\_SELECTED | sent when the DASH client has selected a service description. | Media delivery session identifier |
| SERVICE\_DESCRIPTION\_CHANGED | Sent when the DASH client has changed a service description. | Media delivery session identifier |
| SERVICE\_DESCRIPTION\_VIOLATED | Provides notification that the service description parameters are currently not met. | Media delivery session identifier,  Parameters of service description that are not met |
| SOURCE\_INITIALIZED | Triggered when the source is set up and ready. | Media delivery session identifier |
| DOWNLOAD\_STARTED | Sent when a non-real-time content download begins. | Media delivery session identifier |
| DOWNLOAD\_COMPLETED | Sent when a non-real-time content download is complete. | Media delivery session identifier |
| DOWNLOAD\_ERROR | Send when an error occurs during non-real-time content download | Media delivery session identifier,  Error reason (see table 13.2.5‑2). |

Table 13.2.5-2 provides a list of error reasons that are indicated for notifications of type PLAYBACK\_ERROR and DOWNLOAD\_ERROR.

Table 13.2.5-2: Media Player Error reasons

|  |  |
| --- | --- |
| Error reason | Definition |
| ERROR\_MEDIA\_ENTRY\_NOT\_FOUND | The Media Entry Point resource requested by the Media Player could not be located. |
| ERROR\_CONTENT\_NOT\_FOUND | Other content requested by the Media Player could not be located. |
| ERROR\_MEDIA\_PLAYBACK | There is an error from the media playback platform buffer. |
| ERROR\_INVALID\_MEDIA\_ENTRY | The Media Entry Point resource supplied is not syntactically valid. |
| ERROR\_INACCESSIBLE\_MEDIA\_TIME | The media time requested in a seek operation is not accessible in the current media presentation. |
| ERROR\_UNSUPPORTED\_PROFILE | The profile of the media presentation described by the Media Entry Point resource is not supported by the media playback platform. |
| ERROR\_DOWNLOAD\_DEADLINE\_MISSED | The download of content did not complete before the requested deadline and the incomplete download has been discarded. |

\* \* \* Next Change (new clause G.5 to address 1) \* \* \* \*

Annex G (normative):  
DASH in 5G Media Streaming

…

# G.5 In-band client data reporting in DASH

## G.5.1 Overview

This clause provides details on how to instantiate in-band client data reporting as specified in clause 10.5.1 in DASH. In particular, this clause provides requirements and recommendations for the 5GMSd AS and 5GMSd Client to support the following features:

* CMCD-based client data reporting

## G.5.2 CMCD-based client data reporting

### G.5.2.1 General

CMCD-based client data reporting is specified in clause 10.5.1 based on CTA-5004 [CMCDv1].

### G.5.2.2 DASH content offering requirements and recommendations

A 5GMSd AS offering CMCD-based client reporting shall support:

- The requirements and recommendations for the 5GMS AS for CMCD-based client data reporting as specifed in clause 10.5.1.

- The configuration of this feature by means of the client data reporting configuration for CMCD defined in clause K.3.7 of ISO/IEC 23009-1 [32], using the in-band Service Description defined in clause K.4.3.7.2 of ISO/IEC 23009-1 [32]. This includes for example:

- The ability to restrict the subset of Service Locations, Adaptations Sets and/or media object types for which CMCD information is reported.

- The ability to declare a content identifier for the purpose of client data reporting by populating the CMCD cid key based on the details in clauses K.3.7 and K.4.2.7 of ISO/IEC 23009-1 [32].

- The ability to explicitly specify a set of CMCD keys to be reported based on the details in clauses K.3.7 and K.4.2.7 of ISO/IEC 23009-1 [32].

### G.5.2.3 Media Player requirements and recommendations

A Media Player supporting CMCD-based client data reporting shall support:

- The requirements and recommendations for the Media Player for CMCD-based client data reporting specified in clause 10.5.1.

- The derivation and reporting of all metrics defined CTA-5004 [CMCDv1].

- The response to the content offering for CMCD-based client reporting as defined in clause G.5.2.2. If values are configured via the Media Player configuration and settings API at reference point M7d/M11d and in the MPD, then the value provided on the M7d/M11d API shall take precedence as specified in clause 10.5.1.

### G.5.2.4 Examples (informative)

Listing G.5.2.4-1 provides an example for CMCD in-band configuration with the following properties:

- Reporting is restricted to a single service location for either dist1 or dist2.

- Reporting is restricted to video Adaptations Sets only.

- Reporting is restricted to segments,

- Content identifier reporting is requested because the CMCD cid key is included and the respective content identifier is specified,

- A set of CMCD keys to be reported is specified as keys="br,bl,cid,dl,mtp,nor,ot,sf,v".

Listing G.5.2.4-1 MPD with CMCD inband configuration

|  |
| --- |
| <?xml version="1.0" encoding="UTF-8"?>  **<MPD**  xmlns:xsi=*"http://www.w3.org/2001/XMLSchema-instance"*  xmlns=*"urn:mpeg:dash:schema:mpd:2011"*  xsi:schemaLocation=*"urn:mpeg:dash:schema:mpd:2011 DASH-MPD.xsd"*  type=*"dynamic"*  minimumUpdatePeriod=*"PT2S"*  timeShiftBufferDepth=*"PT30M"*  availabilityStartTime=*"2014-10-17T17:17:05Z"*  minBufferTime=*"PT4S"*  profiles=*"urn:mpeg:dash:profile:isoff-live:2011"*  publishTime=*"2014-10-17T17:17:05Z"***>**  **<BaseURL** serviceLocation=*"dist1"***>**http://distribution-1.com-provider-service.ms.as.3gppservices.org/**</BaseURL>**  **<BaseURL** serviceLocation=*"dist2"***>**http://distribution-2.com-provider-service.ms.as.3gppservices.org/**</BaseURL>**    <ServiceDescription id="1250">      <Scope schemeIdUri="urn:mpeg:dash:event:service-description:2024"/>      <Latency min="750" max="4200" target="1250" referenceId="7"/>      <PlaybackRate min="0.96" max="1.04"/>      <ClientDataReporting scheme="urn:mpeg:dash:cta-5004:2023"                           serviceLocations="dist1"                           adaptationSets="video">        <CMCDParameters mode="header"                        contentID="md:cid:EIDR:10.5240%2f0EFB-02CD-126E-8092-1E49-W"                        includeInRequests="segment"                        keys="br,bl,cid,dl,mtp,nor,ot,sf,v"/>      </ClientDataReporting>    </ServiceDescription>    <ServiceDescription id="2500">      <Scope schemeIdUri="urn:mpeg:dash:event:service-description:2024"/>      <Latency min="750" max="4200" target="2500" referenceId="7"/>      <PlaybackRate min="0.96" max="1.04"/>      <ClientDataReporting scheme="urn:mpeg:dash:cta-5004:2023"                           serviceLocations="dist2"                           adaptationSets="video">        <CMCDParameters mode="header"                        contentID="md:cid:EIDR:10.5240%2f0EFB-02CD-126E-8092-1E49-W"                        includeInRequests="segment"                        keys="br,bl,cid,dl,mtp,nor"/>      </ClientDataReporting>    </ServiceDescription>  **<Period** id=*"1"***>**  *<!-- Video -->*  **<AdaptationSet**  mimeType=*"video/mp4"*  codecs=*"avc1.4D401F"*  frameRate=*"30000/1001"*  segmentAlignment=*"true"*  startWithSAP=*"1"***>**  **<BaseURL>**video/**</BaseURL>**  **<SegmentTemplate** timescale=*"90000"* initialization=*"$Bandwidth$/init.mp4v"* media=*"$Bandwidth$/$Time$.mp4v"***>**  **<SegmentTimeline>**  **<S** t=*"0"* d=*"180180"* r=*"432"***/>**  **</SegmentTimeline>**  **</SegmentTemplate>**  **<Representation** id=*"v0"* width=*"320"* height=*"240"* bandwidth=*"250000"***/>**  **<Representation** id=*"v1"* width=*"640"* height=*"480"* bandwidth=*"500000"***/>**  **<Representation** id=*"v2"* width=*"960"* height=*"720"* bandwidth=*"1000000"***/>**  **</AdaptationSet>**  *<!-- English Audio -->*  **<AdaptationSet** mimeType=*"audio/mp4"* codecs=*"mp4a.40"* lang=*"en"* segmentAlignment=*"0"* startWithSAP=*"1"***>**  **<SegmentTemplate** timescale=*"48000"* initialization=*"audio/en/init.mp4a"* media=*"audio/en/$Time$.mp4a"***>**  **<SegmentTimeline>**  **<S** t=*"0"* d=*"96000"* r=*"432"***/>**  **</SegmentTimeline>**  **</SegmentTemplate>**  **<Representation** id=*"a0"* bandwidth=*"64000"***/>**  **</AdaptationSet>**  *<!-- French Audio -->*  **<AdaptationSet** mimeType=*"audio/mp4"* codecs=*"mp4a.40"* lang=*"fr"* segmentAlignment=*"0"* startWithSAP=*"1"***>**  **<SegmentTemplate** timescale=*"48000"* initialization=*"audio/fr/init.mp4a"* media=*"audio/fr/$Time$.mp4a"***>**  **<SegmentTimeline>**  **<S** t=*"0"* d=*"96000"* r=*"432"***/>**  **</SegmentTimeline>**  **</SegmentTemplate>**  **<Representation** id=*"b0"* bandwidth=*"64000"***/>**  **</AdaptationSet>**  **</Period>**  **</MPD>** |

\* \* \* End of Changes \* \* \* \*