**3GPP TSG- Meeting #**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network | **X** |

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| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
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| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
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| ***Reason for change:*** | | In [TR 26.804](https://www.3gpp.org/ftp/Specs/archive/26_series/26.804/26804-j01.zip), the analysis in clause 5.19.7 provides the following summary:  This Key Issue has considered the integration of different technologies into the 5G Media Streaming System that allow downlink media streaming applications to efficiently access content located across multiple content sources/endpoints. These technologies include:  - DNS-based switching,  - MPEG-DASH client-side switching,  - Content steering driven switching,  - SAND4M multi-source/endpoint delivery (to a limited extent), and  - CMMF-based multi-source/endpoint delivery.  In almost all cases, these technologies may be employed over-the-top of the 5GMS System using methods outside the scope of 5GMS (with the exception that the 5GMS Client is underspecified regarding multi-source/endpoint operation). However, explicit support for multi-source/endpoint media delivery throughout the 5GMS System is recommended through the following changes to 5GMS specifications.  This clause addresses the MPEG-DASH client side switching, Content steering with DASH, and SAND4M | | | | | | | | |
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| ***Summary of change:*** | | Add a clause in Annex G for using DASH for multiple service locations. | | | | | | | | |
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| ***Consequences if not approved:*** | | Feature not supported. | | | | | | | | |
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| ***Clauses affected:*** | | 2, G.4 (new), G.5 (new), G.6 (new) | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS 26.510 CR 0016  TS 26.512 CR 0086  TS 26.512 CR 0093 | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
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| ***Other comments:*** | | This document is submitted as basis for future work. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | |  |  | | --- | --- | | TDoc | [S4-251370](https://www.3gpp.org/ftp/tsg_sa/WG4_CODEC/TSGS4_133-e/Docs/S4-251370.zip) | | Title | [AMD\_PRO-MED] Support for multiple Service Locations in DASH | | Source | Qualcomm Incorporated | | Contact | Thomas Stockhammer | | Agenda Item | 8.5 | | E-mail Discussion | [Gabin, Frederic on Fri, 18 Jul 2025 07:39:05 +0000](https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_SA_WG4_MBS;e0202fa9.2507c)  [Richard Bradbury on Fri, 18 Jul 2025 09:00:54 +0100](https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_SA_WG4_MBS;1c0251b3.2507c)  [Cloud, Jason on Sat, 19 Jul 2025 20:58:21 +0000](https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_SA_WG4_MBS;b9810bfa.2507c)  [Gabin, Frederic on Mon, 21 Jul 2025 11:35:29 +0000](https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_SA_WG4_MBS;5e59d0d1.2507c) | | Revisions | [S4-251370\_BBC.docx](https://www.3gpp.org/ftp/tsg_sa/WG4_CODEC/TSGS4_133-e/Inbox/Drafts/MBS/S4-251370_BBC.docx)  [S4-251370\_BBC\_Dolby.docx](https://www.3gpp.org/ftp/tsg_sa/WG4_CODEC/TSGS4_133-e/Inbox/Drafts/MBS/S4-251370_BBC_Dolby.docx) | | Minutes | \_BBC\_Dolby version presented by Thomas.   * Richard: The other contribution creates a DASH Annex for the DRM. We could add this.   + Thomas: The other one is about DRM. This one is co-CR ideas. I didn’t want to write a CR because I think this is owned by Jason and the terminology should be aligned with multi-service terminology.I just want to make sure that we are not contradicting.   + Jason: I think it belongs to WT2.   + Thomas: We could create dependencies but we should align the terminologies. * Iraj: Is there another clause talking of multiple locations for other things than DASH?   + Jason: You have CMMF which can apply to DASH, HLS, … | | Disposition | Noted. But the content is sent to S4-251502 which will go to plenary for endorsement. | | Status | noted | | | | | | | | | |

## ===== CHANGE =====

# 2 References

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[40] ISO/IEC 23000-19: "Information technology – Multimedia application format (MPEG‑A) – Part 19: Common media application format (CMAF) for segmented media".

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## ===== CHANGE =====

# G.4 DASH content distribution using multiple service locations

## G.4.1 Overview

This clause defines the requirements and recommendations to support content distribution from multiple service locations at reference point M4d in DASH-based downlink media streaming according to clause 5.2.6 of TS 26.501 [2]. General requirements and different technologies are introduced, including:

- Content steering

- Client-side switching

The `focus in this clause is on media resources and transport resources that conform to DASH Segments as specified in ISO/IEC 23009‑1 [32]. Object encoding is not considered in this clause.

In particular, the base URL concept and service locations as defined in [32] are leveraged to support multiple service locations. A service location in MPEG-DASH is defined as "a collection of network resources that share commonalities and can be referred to by a common label". The BaseURL element may be used to specify one or more common locations for DASH Segments and other resources. Service locations are labels for base URLs, indicated in the MPD by an attribute of the BaseURL element.

Clause 5.6 of [32] specifies how to apply base URLs to each relative URL in the MPD to construct an absolute URL suitable for retrieving transport objects containing media resources, as well as specifying rules for handling multiple alternative base URLs, one of the key aspects to support multiple service locations in the 5GMS System.

## G.4.2 General Content Preparation requirements to support multiple service locations

### G.4.2.1 Introduction

This clause specifies general requirements for preparing DASH content to make it suitable for distribution via different service locations in the 5GMS System, in particular the configuration information required by the 5GMSd AS in order to perform any necessary content preparation. Two different variants are supported:

1. DASH content ingested by the 5GMSd AS through reference point M2d, including a provided DASH MPD, already includes different base URLs with service location tags. The content preparation needs to provide a mapping of the service locations in the MPD to the provisioned service locations on the 5GMSd AS. For details refer to clause G.4.2.2.

2. DASH content ingested through reference point M2d conforms to TS 26.511 [35] or at least CMAF per ISO/IEC 23000‑19 [40], and the 5GMSd AS creates an MPD that includes multiple service locations based on the provisioning information and the content preparation information. For details refer to clause G.4.2.3.

The following assumptions are common to both scenarios:

1. Multiple service locations have been provisioned at reference point M1d as distinct distribution configurations using the Content Hosting Provisioning (M1) API specified in clause 7.6 and following the Content Hosting provisioning (M1) procedures specified in clause 4.3.3.

### G.4.2.2 Pre-configured service locations

In this case, content ingested by the 5GMSd AS through reference point M2d, including a provided DASH MPD, already includes different base URLs with service location tags. The content preparation needs to replace the base URLs of each service location in the provided MPD with a provisioned service location on the 5GMSd AS, and to make a modified MPD available to the 5GMS Client via reference point M4d.

The ingested Media Presentation is described by an MPD that shall indicate the following parameters for each service location:

1. (Required) A BaseURL elementincluding a @serviceLocation attribute that fulfils the requirements for a service location as specified in ISO/IEC 23009-1 [32]. If this service location is to be exposed by the 5GMSd AS at reference point M4d, it shall be associated with a Distribution Configuration provisioned in the 5GMSd AF Content Hosting Configuration by matching its @serviceLocaton attribute value with the value of a DistributionConfiguration.distributionId property (see clause 8.8.3.1 of TS 26.510 [56]).

2. (Optional) An @availabilityTimeOffset attribute adjusting the Segment availability time for this service location.

3. (Optional) An @availabilityComplete attribute indicating whether all Segments of all associated Representations are complete at the adjusted availability start time.

4. (Optional) A @timeShiftBufferDepth attribute indicating, for a DASH Media Presentation of type dynamic, the duration of the smallest timeshift buffer for which Segments of any Representation are guaranteed to remain available.

5. (Optional) A @rangeAccess attribute indicating whether or not partially available Segments may be accessed with an HTTP byte range request.

- In the case where the attribute value indicates that partially available Segments may be accessed with an HTTP byte range request, if a Media Player makes a byte-range request against a partially available Segment, and the first-byte position of that range request is non-zero, and the Media Player desires a continuously aggregating/live response, then it should signal this using the convention of RFC 8673 [61]. Specifically, it should use a last-byte value of 9007199254740991. When responding to Segment requests through this service location, the 5GMSd AS shall return a HTTP 206 (Partial Content) aggregating response instead of responding with a 200 (OK) response and a Content-Length response header after waiting for the end of the Segment to become available.

- Otherwise, the Media Player should not expect a response corresponding to the requested byte range.

Based on this information, the 5GMSd AS offers DASH content associated with its provisioned service locations accordingly to the 5GMS Client via reference point M4d.

### G.4.2.3 Configuration of service locations in the 5GMSd AS

In this case, content ingested by the 5GMSd AS through reference point M2d conforms to TS 26.511 [35] or at least CMAF per ISO/IEC 23000‑19 [40], and the 5GMSd AS creates an MPD that includes multiple service locations based on the provisioning information and the content preparation information. The ingested content may be described by an MPD conforming to a DASH profile for CMAF content as specified in ISO/IEC 23009‑1 [32].

In order to create an MPD for M4d distribution using the provisioning information as well as the CMAF content annotation, the content preparation information shall include

1. A mapping of included CMAF tracks to one or multiple service locations.

2. Relevant attributes to configure each service location by providing the relevant values for the BaseURL element. For details of each of the attributes, refer to clause G.4.2.2.

Based on this information, the 5GMSd AS offers DASH content associated with its provisioned service locations accordingly to the 5GMS Client via reference point M4d.

## G.4.3 DASH content offering requirements and recommendations

A 5GMSd AS offering a DASH Media Presentation with multiple service locations shall provide a service offering that conforms to a DASH Media Profile for CMAF content as defined in ISO/IEC 23009-1 [32], with the following additional requirements:

1. For each Representation that represents a CMAF track, all BaseURL elements shall be associated with this Representation whereby the value of the element is the base URL provided in the template and the value of the @serviceLocation attribute shall be set to the distributionBaseURL of the corresponding service location provisioned in a Distribution Configuration of the Content Hosting Configuration.

2. For each base URL, the associated parameters specified in clause G.4.2.2 may be set as well, and may be mapped to the BaseURL element.

3. The resources shall be made available by the 5GMSd AS at reference point M4d according to the configuration for each base URL.

## G.4.4 Media Player requirements and recommendations

A Media Player supporting multiple service locations shall request content from an alternative base URL declared in the MPD (using a BaseURL element) if the endpoint of one service location fails.

## G.4.5 Examples

For examples, to be added.

# G.5 Content steering

Editor’s Note: similar preparation, logic for sending steering message up to 5GMS AS, may use CMCD to collect information. Client shall support ETSI TS 103 799.

# G.6 SAND4M

Editor’s Note: similar preparation, logic for sending steering message up to 5GMS AS. Client shall support TS 26.247.