**3GPP TSG-SA WG4 Meeting #131 S4-250025**

**Geneva, Switzerland, 17 – 21 February 2025 revision of S4aI250065**

**Source: Qualcomm Incorporated**

**Title: [Draft] New WID on Stage 3 for Advanced Media Delivery**

**Document for: Agreement**

**Agenda Item: 17.1**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title: Stage 3 for Advanced Media Delivery

Acronym: AMD\_PRO-MED

Unique identifier: 1060069

Potential target Release: Rel-19

# 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  | X |  | X |  |
| No | X |  | X |  | X |
| Don't know |  |  |  |  |  |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

This work item is a …

|  |  |
| --- | --- |
|  | Study  |
|  | Normative – Stage 1 |
|  | Normative – Stage 2 |
| X | Normative – Stage 3 |
|  | Normative – Other\* |

**\* Other = e.g. testing**

## 2.2 Parent Work Item

|  |
| --- |
|  Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| AMD-ARCH-MED | S4 | 1060069 | Stage 2 for Advanced Media Delivery |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| 840001 | 5GMS3 5G Media Streaming stage 3 (5GMS3) | Addressed stage-3 in 5G Media Streaming by updating TS 26.247 as well as new specs in TS 26.511, TS 26.512, and TS 26.117. |
| 900029 | Study on 5G media streaming extensions (FS\_5GMS\_EXT) | Studied the current limitation of 5G Media Streaming architecture and documented possible extensions in TR 26.804. |
| 870014 | Feasibility Study on Multicast Architecture Enhancements for 5G Media Streaming (FS\_5GMS\_Multicast) | Identified and evaluated potential enhancements to the 5G Media Streaming Architecture to provide multicast-broadcast media streaming services in TR 26.802. |
| 960047 | 5G Media Streaming Architecture Phase 2 (5GMSA\_Ph2) | Addressed stage-2 of extensions to 5G Media Streaming Architecture |
| 1000018 | 5G Media Streaming Protocols Phase 2 (5GMS\_Pro\_Ph2) | Addressed stage-3 in 5G Media Streaming by updating TS 26.512 and creating TS 26.510 |
| 940008 | 5G Multicast-Broadcast Protocols | Initial work item to provide protocols for MBS |
| 960048 | Study on Media Streaming aspects of Network Slicing Phase 2 (FS\_MS\_NS\_Ph2) | Study to conclude on Media Streaming aspects of Network Slicing |
| 1030006 | Study on Advanced Media Delivery (FS\_AMD) | Preparatory study for this normative work. |

# 3 Justification

TS 26.501 defines the 5GMS architecture, call flows, and procedures. TS 26.512 defines the 5G Media Streaming protocols. In the 5GMS\_Ph2 work item, extensions to 5G Media Streaming architecture are provided. In the 5GMS\_Pro\_Ph2, extensions to 5G Media Streaming Protocols were provided and generalized the topic of media delivery by providing TS 26.510. In addition, for MBS, the User Service architecture was developed in TS 26.502 and MBS Protocols are defined in TS 26.517. It is also worth noting that 5G-MAG has defined reference implementations of both 5G Media Streaming and MBS. The implementation provides feedback for potential bugfixes.

However, mobile media delivery is as important as never before with everlasting growth of traffic and new functionalities provided by third-party service providers. Several potential improvement areas and potential extensions have been identified and should be studied further.

The primary focus of this Work Item is the delivery of segmented media objects in the media plane, i.e. at reference points M2, M4 and M7 of the Media Delivery architecture.

Stage-2 work has been completed as part of the AMD-ARCH-MED work item. Based on the outcome of the study on FS\_AMD and AMD-ARCH-MED work item, this work item proposes stage-3 specification work.

TR 26.802 has been updated with relevant key issues and conclusions and for the following issues, stage-3 work has been recommended in clause 8.4.3 of TR 26.802:

1. For *Key Issue #8: In-session unicast repair for MBS Object Distribution* as introduced in clause 5.9 and based on the conclusions in clause 5.9.7 of TR26.802.

2. for *Key Issue #9: MBS User Service and Delivery Protocols for eMBMS* as introduced in clause 5.10 and based on the conclusions in clause 5.10.6 of TR26.802.

3. For *Key Issue #10: Selected MBMS Functionalities not supported in MBS* as introduced in clause 5.11 and based on the conclusions in clause 5.11.4 of TR26.802.

TR 26.804 has been updated with relevant key issues and conclusions in clause 7.3.3, stage-3 work has been recommended:

1. For *Common Client Metadata* as introduced in clause 5.16 of TR26.804 and based on the conclusions in clause 6.16 of TR26.804.

2. For *Media delivery from multiple service endpoints/locations* as introduced in clause 5.19 of TR26.804 and based on the conclusions in clause 6.19 of TR26.804.

3. For *Multi-access media delivery* as introduced in clause 5.18 and based on the conclusions in clause 6.18 of TR26.804.

4. For *Distributing DRM-protected, encrypted and high-value content* as introduced in clause 5.10 and based on the conclusions in clause 6.10 of TR26.804.

5. For *Improved QoS support for Media Streaming services* as introduced in clause 5.23 and based on the conclusions in clause 6.23 of TR26.804.

In addition, the Study on Media Streaming aspects of Network Slicing Phase 2 (FS\_MS\_NS\_Ph2) concluded in TR 26.941 for stage-3 to be implemented into TS 26.510.

1. The changes to the *PolicyTemplate* resource data model definition described in clause 6.1.2.1 of TR 26.941 be implemented in TS 26.510 to support Policy Template provisioning for a plurality of Network Slices and/or Data Networks

2. other relevant aspects resulting from stage-2.

The work item addresses the stage-3 updates recommended above.

# 4 Objective

The objective of this work item is to address the recommendations for stage-3 extensions of the studies FS\_AMD and FS\_MS\_NS\_Ph2 in the relevant specifications, primarily TS 26.510, TS 26.512 and TS 26.517, and based on the stage-2 extensions in TS 26.501 and TS 26.502. Specifically, the following objectives are identified:

1. Provide relevant extensions for MBS protocols:

a. For *Key Issue #8: In-session unicast repair for MBS Object Distribution* as introduced in clause 5.9 of TR 26.802, address Gaps #2, #3, #4, and #5 in clause 5.9.5 by the candidate solution in clause 5.9.6 in TS 26.517 and possibly in TS 26.346:

i. On gap #2 identified in clause 5.9.5 of TR 26.802, both of the following signalling options are expected to be supported:

- Using FDT parameters to signal the time when repairs can be requested using the Expires attribute).

- Using LCT header information to signal the time when repairs can be requested using the B-Flag.

ii. On Gap #3 identified in clause 5.9.5 of TR 26.802, the following signalling options exist in the FLUTE File Delivery Table (FDT):

- Defining a new FDT extensions parameter to signal the availability time when the object needs to be released.

iii. On gap #4 identified in clause 5.9.5 of TR 26.802, the execution of MBS object delivery and in-session unicast repair can run in parallel in the MBS Client. However, this should be validated if there are cases this is not the case and whether these cases need to be explicitly stated, for example reduced capability (RedCaP) UEs.

iv. On gap #5 identified in clause 5.9.5 of TR 26.802, time synchronization can reuse functionalities defined in TS 26.346, but tighter synchronization that 1 second. This work is aligned with the findings and work in clause 5.11.3.6 of TR 26.802.

ii. other relevant aspects resulting from stage-2.

b. For *Key Issue #9: MBS User Service and Delivery Protocols for eMBMS* as introduced in clause 5.10 of TR 26.802 based on the conclusions in clause 5.10.6 of TR 26.802:

- Address the relevant stage-3 aspects based on stage-2 work.

c. For *Key Issue #10: Selected MBMS Functionalities not supported in MBS* as introduced in clause 5.11 of TR 26.802:

i. Address the relevant stage-3 aspects based on stage-2 work.

iv. Adapt time synchronization as defined in clause 4.6 of TS 26.346 to MBS User Services.

2. Provide relevant extensions to the Stage 3 5G Media Streaming protocols:

a. for *Common Media Client Data (CMCD)* as introduced in clause 5.16 of TR 26.804:

i. Updates to TS 26.247 to introduce CMCD

ii. Updates to TS 26.510 to introduce CMCD, if needed

iii. Updates to TS 26.512 to introduce CMCD,

iv. Updates to TS 26.532 to introduce CMCD, and

v. other relevant aspects resulting from stage-2.

b. for *Multi-access media delivery* as introduced in clause 5.18 of TR 26.804:

i.Changes to the Media Session Handling Client APIs (Configuration Settings API and to the Dynamic Status Information API) as described in clause 5.15.6.2 of TR 26.804 need to be implemented in TS 26.510 to allow for application configuration and status information exchange for multi-access media delivery.

ii. other relevant aspects resulting from stage-2.

c. For *Media delivery from multiple service endpoints/locations* as introduced in clause 5.19 of TR 26.804:

i. Document the generic MIME content types and references to valid profiles or relevant external specifications for Content Preparation Templates used for the purposes of multi-source/service location content preparation (item 2 of clause 5.19.7 of TR 26.804).

ii. Extend the ContentHostingConfiguration resource to allow Content Distributions to be declared in hierarchical or peer-to-peer configurations (item 4 of clause 5.19.7 of TR 26.804).

iii. Extend the ContentHostingConfiguration resource to allow the 5GMSd Application Provider the capability to influence the configuration and deployment of Content Distributions with the 5GMSd AS at the time of provisioning (item 5 of clause 5.19.7 of TR 26.804).

iv. Clarify the use of the Media Entry Point for the purposes of communicating service location and multi-source/service location configuration information to 5GMSd Clients (item 6 of clause 5.19.7 of TR 26.804).

v. Clarify the expectation that the Media Player natively supports the multi-source/service location approach in use (item 8 of clause 5.19.7 of TR 26.804).

vi. other relevant aspects resulting from stage-2.

d. For *distributing encrypted and high-value content* as introduced in clause 5.10 of TR 26.804:

i. Support the Content Protection Information Exchange Format (CPIX) as specified in ETSI TS 103 799  at reference point M2d.

ii. Support the DASH-IF Interoperability Points specified in DASH-IF IOP Part 6 at reference point M4d for both DASH and HLS.

iii. Specification of a Content Preparation Template format in TS 26.512  that can configure encryption content preparation tasks in the 5GMS AS.

iv. other relevant aspects resulting from stage-2.

e. For *Improved QoS support for Media Streaming services* as introduced in clause 5.23 of TR 26.804 update TS 26.510 to:

i. Integrate *ECN marking for L4S* into the procedures for both 5GMSd and 5GMSu.

ii. Integrate the *QoS monitoring* feature into the procedures for both 5GMSd and 5GMSu.

f. for *Media Streaming aspects of Network Slicing* as concluded in TR 26.941:

i. The changes to the PolicyTemplate resource data model definition described in clause 6.1.2.1 of TR 26.941 need to be implemented in TS 26.510 to support Policy Template provisioning for a plurality of Network Slices and/or Data Networks

ii. other relevant aspects resulting from stage-2.

3. For key topic address the following aspects:

a. specify the required protocols or protocol extensions

b. define relevant APIs

c. specify the OpenAPIs YAML as well as other stage-3 API.

e. address remaining stage-3 aspects.

4. Coordinate work with other 3GPP groups as needed. For details see clause 8.

5. Coordinate work with external organizations such as SVTA (primarily the DASH-IF WG), CTA WAVE, ISO/IEC JTC29 WG3 (MPEG Systems), 5G-MAG, DVB and/or IETF, as needed.

# 5 Expected Output and Time scale

|  |
| --- |
| New specifications {One line per specification. Create/delete lines as needed} |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Rapporteur |
|  |  |  |  |  |  |

|  |
| --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| 26.510 | Protocol Updates for Advanced Media Delivery | SA#109(Sep 25) | Individual CRs for each of the key topics may be provided. |
| 26.512 | Protocol Updates for Advanced Media Delivery | SA#109(Sep 25) | Individual CRs for each of the key topics may be provided. |
| 26.517 | Protocol Updates for Advanced Media Delivery | SA#109(Sep 25) | Individual CRs for each of the key topics may be provided. |
| 26.532 | Protocol Updates for Advanced Media Delivery | SA#109(Sep 25) | Individual CRs for each of the key topics may be provided. |
| 26.247 | Protocol Updates for Advanced Media Delivery | SA#109(Sep 25) | Individual CRs for each of the key topics may be provided. |
| 26.510 | OpenAPI Updates for Advanced Media Delivery | SA#110(Dec 25) | Individual CRs for each of the key topics may be provided. |
| 26.512 | OpenAPI Updates for Advanced Media Delivery | SA#110(Dec 25) | Individual CRs for each of the key topics may be provided. |
| 26.517 | OpenAPI Updates for Advanced Media Delivery | SA#110(Dec 25) | Individual CRs for each of the key topics may be provided. |
| 26.532 | OpenAPI Updates for Advanced Media Delivery | SA#110(Dec 25) | Individual CRs for each of the key topics may be provided. |

# 6 Work item Rapporteur(s)

Thomas Stockhammer, Qualcomm Incorporated, tsto@qti.qualcomm.com

# 7 Work item leadership

SA4

# 8 Aspects that involve other WGs

SA2 for architectural discussions.

SA3 for security related discussions, if needed.

CT3/CT4 for network reference points.

# 9 Supporting Individual Members

|  |
| --- |
| **Supporting IM name** |
| AT&T |
| ATEME |
| BBC |
| China Mobile Com. Corporation |
| China Unicom |
| Comcast |
| Dolby France SAS |
| EBU |
| Ericsson LM |
| Huawei Technologies Co Ltd. |
| NTT |
| Orange |
| Qualcomm Incorporated |
| Rohde & Schwarz |
| Samsung Electronics Co. Ltd. |
| Sony Europe B.V. |
| SWR |
| Telecom Italia |
| Tencent |
| ZTE |