**3GPPSA4 #121-e S4- 221291**

**E-meeting, 14-18 Nov 2022**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **26**.**501** | **CR** | 42 | **rev** | **1** | **Current version:** | **17.3.0** |  |
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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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|  | | | | | | | | | | |
| ***Title:*** | **[5GMSA\_PH2] Uplink streaming: removing FLUS and updating the workflows** | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Tencent | | | | | | | | | |
| ***Source to TSG:*** | SA4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5GMSA\_PH2 | | | | |  | ***Date:*** | | | 11/08/2022 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | This document removes the references to FLUS source and sink, and updates the section for provisioning and content publishing configuration | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. 4.3.2: removing references to FLUS 2. New 4.3.3 providing service access information for uplink streaming 3. 6.2.1: updating the introduction 4. 6.2.2: replacing sink configuration with    1. Provisioning domain model    2. Baseline provisioning procedure 5. 6.2.3 replacing source configuration with content publishing configuration 6. 6.4 updating the tear down process 7. 7.1 Removing FLUS references 8. 7.3 Removing FLUS references | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The uplink streaming feature is not useable. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | **Rev 1: Improved the call flows and the description of the steps.** | | | | | | | | |

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### 4.3.2 UE Media Functions

The UE may include many detailed subfunctions that can be used individually or controlled individually by the 5GMSu-Aware Application. This clause breaks down several relevant identified subfunctions for which stage 3 specification is available.

The 5GMSu-Aware Application itself may include many functions that are not provided by the 5GMSu Client or to the 5G UE. Examples include peripheral discovery, notifications and social network integration. The 5GMSu-Aware Application may also include functions that are equivalent to ones provided by the 5GMSu Client and may only use a subset of the 5GMSu Client functions.

With respect to the Media Streamer and Media Handler functions, Figure 4.3.2-1 shows more detailed functional components of a 5GMSu Client.



Figure 4.3.2-1: UE 5G Uplink Media Streaming Functions

NOTE 1: A UE is a logical device which may correspond to the tethering of multiple physical devices or other types of realizations.

The following subfunctions are identified as part of a more detailed breakdown of the UE 5G Uplink Media Streaming functions:

- **5GMSu-Aware Application:** application which is out of scope of the present specification and which uses the UE 5G Uplink Media Streaming functions and APIs.

- **Media Capturing:** Devices such as video cameras or microphones that transform an analogue media signal into digital media data.

- **Media Encoder(s):** Compresses the media data.

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- **Media Upstream Client:** encapsulates encoded media data and pushes it upstream.

- **Network Assistance:** uplink streaming delivery assisting functions provided by the network to the 5GMSu Client and Media Streamer in the form of bit rate recommendation (or throughput estimation) and/or delivery boost. Network Assistance functionality may be supported by 5GMSu AF or ANBR-based RAN signalling mechanisms.

- **Media Remote Control:** receives control commands from a 5GMSu AF.

- **Core Functions:** configures the 5GMSu AS for uplink streaming reception.

Here are the roles of the different APIs of the UE 5G Uplink Media Streaming functions:

- M6u: API used to control the Core Functions and the Media Remote Control function.

- M7u: API used to configure, activate and stop the Media Capturing, Media Encoding(s) and Media Upstream Client functions, and also to support metrics configuration and collection functionality.

### 4.3.3 Service Access Information for Uplink Media Streaming

The Service Access Information is the set of parameters and addresses which are needed by the 5GMSu Client to activate and control the uplink streaming session.

The Service Access Information may be provided together with other service announcement information by the 5GMSu Application Provider to the 5GMSu Aware Application using M8u. Alternatively, the 5GMSu Client fetches the Service Access Information from the 5GMSu AF at reference point M5u. Regardless of how it is provided, the Service Access Information contains different information, depending on the collaboration model between the 5GMS System and the 5GMSu Application Provider (which are assumed to be independent entities), and also depending on offered features. Baseline parameters are listed in Table 4.3.3‑1 below:

Table 4.3.3-1: Parameters of baseline service access information

|  |  |
| --- | --- |
| Parameters | Description |
| Provisioning Session identifier | Unique identification of the M1u Provisioning Session. |

The parameters from Table 4.3.3-2 below shall also be present.

Table 4.3.3-2: Streaming Access parameters

|  |  |
| --- | --- |
| Parameters | Description |
| Media entry points | A set of entry points. Each entry point consists of one of the followings:   1. An URL endpoint on the 5GMSu AS to which media can be streamed directly at M4u and its associated data, or 2. The URL of a document that can be downloaded from the 5GMSu AS which contains the parameters for uplink media streaming at M4u. |

Each entry point is defined by its parameters and identifiers. The set shall have at least one member.

When the dynamic policy invocation feature is activated for an uplink streaming session the parameters from table 4.3.3‑3 below are additionally present.

Table 4.3.3-3: Parameters for dynamic policy invocation configuration

|  |  |
| --- | --- |
| Parameters | Description |
| Server address | A list of 5GMSu AF addresses (in the form of opaque URLs) which offer the APIs for dynamic policy invocation sent by the 5GMS Media Session Handler. |
| Valid Policy Template Ids | A list of Policy Template identifiers which the 5GMSu Client is authorized to use. |
| Service Data Flow Methods | A list of recommended Service Data Flow description methods (descriptors), e.g. 5-Tuple, ToS, 2-Tuple, etc, which should be used by the Media Session Handler to describe the Service Data Flows for the traffic to be policed. |
| External reference | Additional identifier for this Policy Template, unique within the scope of its Provisioning Session, that can be cross-referenced with external metadata about the streaming session. |

When 5GMSu AF-based Network Assistance is activated for an uplink streaming session the parameters from table 4.3.3‑4 below shall be additionally present.

Table 4.3.3-4: Parameters for 5GMSu AF-based Network Assistance configuration

|  |  |
| --- | --- |
| Parameters | Description |
| Server address | 5GMSu AF address that offers the APIs for 5GMSu AF-based Network Assistance, accessed by the 5GMSu Media Session Handler. The server address shall be an opaque URL, following the 5GMS URL format. |

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## 6.2 Preparing for Uplink Media Streaming

### 6.2.1 Introduction

Before streaming media data in the uplink direction, a set of parameters are provisioned at the 5GMSu AF/AS and at the 5GMSu Client. On the UE side, the M8u or M5u API is used for provisioning.

### 6.2.2 Provisioning session for uplink streaming

### 6.2.2.1 Domain model

The M1u baseline domain model is depicted in figure 6.2.2.1-1 overleaf. It consists of a Provisioning Session, which contains at least one of the following:

- A Content Publishing Configuration,

- A Policy Template,

- One or more Content Preparation Templates,

- An *Edge Resources Configuration* specifying the requirements for edge processing as defined in TS 23.548 [15] and TS 23.558 [16] in support of the Provisioning Session, including eligibility criteria that indicate the circumstances in which edge computing is to be used for Media Streaming sessions associated with this Provisioning Session and parameters indicating the tolerance of the application for relocation of the Edge AS, or

Each Provisioning Session is uniquely identified within the 5GMS System by a Provisioning Session identifier.

When a certain 5GMS feature (such as content publishing configuration, policy template, content preparation template or edge resource configuration) is selected, the 5GMSu AF compiles the resulting Service Access Information that the 5GMSu Client need to have to access the services via M5u.



Figure 6.2.2.1-1: M1u provisioning domain model

### 6.2.2.2 Baseline provisioning procedure

This clause describes the baseline procedure to provision the features using the 5GMS System.

NOTE 1: SLA negotiations between the 5GMSu Application Provider and the 5GMS System provider are outside the scope of the present specification and are included in the figure below for illustrative purposes only.



Figure 6.2.2.2-1: High Level Procedure for provisioning the 5GMS System for uplink streaming sessions

Steps:

1. The 5GMSu Application Provider authenticates itself with the system. This procedure reuses existing authentication/authorization procedures, e.g. as defined for CAPIF [13].

2. The 5GMSu Application Provider creates a Provisioning Session, providing its 5GMSu Application Provider identifier as input. 5GMSu Application Provider queries the capabilities and authorized features.

3. The 5GMSuApplication Provider specifies one or more 5GMSu features in the Provisioning Session. A set of authorized features is activated, such as content dynamic policy; network assistance; and content publishing (including egest).

When the content publishing feature is offered and selected, the 5GMS Application Provider configures the content publishing behaviour of the 5GMSu AS, including selecting the uplink ingest protocol and format, content preparation and egest protocol and format.

When the dynamic policy feature is offered and selected, the 5GMSu Application Provider specifies a set of policies which can be invoked for the uplink streaming session. The UE becomes aware of the selected policies in the form of a list of valid Policy Template Ids.

When the edge computing feature is offered and selected, the 5GMSu Application Provider provides one or more Edge Resources Configurations that can be used to support either client-driven management or Application Provider-driven management of edge resources associated with the Provisioning Session.

4. When content publication is desired, the 5GMSu AF interacts with the 5GMSu AS to allocate resources for M2u egest protocol and format. Then the 5GMSu AS responds to the 5GMSu AF with the M2u content egest address.

5. The 5GMSu AF compiles the Service Access Information. The Service Access Information contains access details and options such as the Provisioning Session identifier, M5u (Media Session Handling) addresses for uplink entry point, dynamic policy, network assistance, etc.

6. The 5GMSu AF provides the results to the 5GMSu Application Provider.

One of steps 7 or 8:

7. When the 5GMSu Application Provider has selected full Service Access Information, then the results are provided in the form of addresses and configurations for M2u (egest), M5u (Media Session Handling) and M4u (Media Uplink Streaming). The 5GMSu Application Provider provides a subset of this information to the 5GMSu Application through M8u.

or

8. When the 5GMSu Application Provider delegated the service access information handling to the 5GMS System, then a reference to the Service Access Information (e.g. an URL) is provided. The Media Session Handler fetches the full Service Access Information later from the 5GMSu AF.

9. When content publishing is offered and has been selected in step 4, the 5GMSu Application Provider can start retrieving the content from the M2u egest interface.

Note: The uplink streaming from UE to 5GMSu AS and optionally the content preparation in AS are necessary before egesting the content. Those steps are not shown here.

Optionally:

10. The 5GMSu Application Provider may update the Provisioning Session.

According to schedule, or upon request by the 5GMSu-Aware Application:

11. The 5GMSu Application Provider may manually terminate the Provisioning Session (at any time). All associated resources are released. Content may be removed from the 5GMSu AS. The 5GMSd Application Provider may configure a schedule for Provisioning Session termination.

12. The 5GMSu AF sends a notification to the 5GMSu Client upon Provisioning Session termination.

The 5GMSu AF may request the creation or reuse of one or more network slices for ingesting the content of the provisioned session. If more than one network slice is provisioned for the ingest of the content of a session, the list of allowed S‑NSSAIs shall be conveyed to the target UE (e.g. through URSP or through M8u, step 7, or M5u, step 8).

NOTE 2: The 5GMSu AS receiving the content is only accessible through the DNN(s) used by the network slice(s) provisioned for the distribution of that content.

### 6.2.3 Content Publishing Configuration for Uplink Streaming

### 6.2.3.1 General

The 5G Media Streaming architecture defines a reference point (M1u) for provisioning which offers the procedures to configure content egest for uplink media streaming over a 5GMS Sytem. Once a Provisioning Session is established using the API at reference point M1u, content publishing may be configured. Content can then be uplink streamed by the Media Streamer in the 5GMSu Client to the 5GMSu AS through reference point M4u. The uploaded (and possibly processed) content is accessible via reference point M2u for egest.

The M2u interface supports the egest of the following types of content:

- Live streaming content.

- On-demand streaming content. i.e. the content that previously streamed from the UE to 5GMSu AS and is stored in 5GMSu AS.

- Static files such as images, scene descriptions, etc. associated with the uplink streaming content.

The 5GMSu AF provides an API at reference point M1u that allows a 5GMSu Application Provider to create/update/delete a Content Publishing Configuration. A Content Publishing Configuration contains all the parameters for a particular content ingest uplink and egest setup, and optionally includes one or more Content Preparation Templates.

### 6.2.3.2 Media egest procedure

The media egest procedure is as follows:



Figure 6.2.3-1: Media egest procedure

The steps are as follows:

1: Initialization: the 5GMSu Application Provider discovers the M1u end point address and authenticates itself with the 5GMSu AF.

2: Create Content Publishing Configuration: the 5GMSu Application Provider creates a new Content Publishing Configuration through the 5GMSu AF. The configuration specifies path, protocol, entry point, the egest push/pull mode, and possibly one or more content preparation templates. Upon successful configuration, the 5GMSu AF responds with a Content Publishing Configuration identifier, and the location of the 5GMSu AS from which to pull the content (if using the pull mode).

3: Provision 5GMSu AS instance(s): The 5GMSu AF configures the related 5GMSu AS instance(s) for a particular Content Publishing Configuration. This step may involve instructing the 5GMSu AS to establish one or more content preparation processes. The 5GMSu AS(s) respond(s) whether the configuration was successful or not.

4: Confirm provisioning: Upon successful provisioning, the 5GMSu AF responds with a Content Publishing Configuration identifier, and the location of the 5GMSu AS from which to pull the content (if using the pull mode).

One of the following steps:

5: Providing the uplink Entry point: The 5GMSu Application Provider publishes the Uplink Entry point through reference point M8u to the 5GMSu-Aware Application to enable it to uplink streaming to the 5GMSu AS.

Or:

6: The 5GMSu Client acquire the uplink Entry point as part of Service Access Information through reference point M5u.

7: The 5GMSu-Aware Application requests the 5GMSu Client to start the uplink streaming.

8: The 5GMSu Client start uplink streaming of the content to the 5GMSu AS. The 5GMSu AS may perform content preparation if it was requested during the provisioning of the service.

9: Media egest: The 5GMSu Application Provider may start pulling or receiving content (if using push mode) from the 5GMSu AS. The 5GMSu AS performs the requested content preparation prior to making the uplink content ready for being pulled by or pushed to the 5GMSu Application Provider.

NOTE: Pull of media content from the 5GMSu AS may be triggered by a request from the 5MGSu Client through M8u.

The 5GMSdu Application Provider may update a Content Publishing Configuration subsequently to modify some of its parameters. The subset of parameters that can be updated may be limited by the 5GMSu AF.

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## 6.4 Termination of an Uplink Media Streaming Session

The procedure defines the termination of an uplink media streaming session.



Figure 6.4-1: Uplink streaming session teardown

Steps:

1. An uplink media streaming session is active and should be terminated.

One of the following steps:

When the 5GMSu-Aware Application terminates the session, e.g. triggered by user input:

2. The 5GMSu-Aware Application sends a Stop command to the 5GMSu Client.

Or alternatively, if remote control is used and when the remote control session is established:

3. The 5GMSu AF sends a Stop command to 5GMSu Client.

4. The 5GMSu Client stops the capturing process.

5. The uplink transport session is released if needed.

When client assistance was established:

6. The 5GMSu AF is notified that the uplink media streaming session is terminated.

When server assistance was established:

7. The 5GMSu AS is notified the 5GMSu AF that the uplink media streaming session is terminated.

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# 7 5GMS Network Media Processing

## 7.1 General

A 5GMS Application Provider may request media processing to be performed on its media data. This can be instantiated as part of the Uplink or Downlink streaming.

The media processing is performed by the 5GMS AS instances, which may need to build complex media processing workflows. The 5GMS AF coordinates the media processing and ensures that the appropriate QoS and traffic handling for the session are provided.

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## 7.3 Media Processing Procedures for Uplink

The 5GMSu AF instructs the 5GMSu AS to perform processing of the media according to the provided media processing document. The procedure is defined as follows:



Figure 7.3-1: Media Processing Procedures for Uplink

The steps are as follows:

1. Setup of uplink streaming configuration: The 5GMSu Application Provider sends a request to start an uplinksession to the 5GMSu AF. The request contains a description of the media processing that is to be performed by the 5GMSu AS. Depending on the configuration one 5GMSu ASmay be involved.

2. Provision 5GMSu AS: The 5GMSu AF parses the media processing description and provisions the 5GMSu AS that will perform the requested processing. If the requested processing is not accepted, the session creation fails.

3. 5GMSu ASready: The 5GMSu AS confirms the correct configuration and informs the 5GMSu AF that it is ready to receive and process media as requested.

4. Confirm uplink streaming configuration: The 5GMSu AF confirms the successful creation of the uplink streaming configuration to the 5GMSu Application Provider.

5. Uplink streaming session starts: The session is triggered in the 5GMSu Client.

6. Uplink media streaming: Media content is streamed from the 5GMSu Client to the 5GMSu AS.

7. The 5GMSu AS processes the received media based on the provisioned media processing.

END OF CHANGES