**3GPP TSG-S4 Meeting #117-e *S4-220058***

**Online, , 14th–23rd February 2022** revision of S4aI221303

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| *->CR-Form-v12.0* |
| **DRAFT 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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| ***Title:***  |  |
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| ***Source to WG:*** |  |
| ***Source to TSG:*** |  |
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| ***Work item code:*** |  |  | ***Date:*** |  |
|  |  |  |  |  |
| ***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 canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). |  |
|  |  |
| ***Reason for change:*** | Provide instantiation of generic data collection and reporting architecture for the 5G Media Streaming feature domain. |
|  |  |
| ***Summary of change:*** | * Architecture mapping diagram and explanation.
* Cross-references to relevant procedures.
* Procedures for reporting by 5GMSd AS of downlink media streaming access.
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|  |  |
| ***Consequences if not approved:*** | The mapping of 5GMS to EVEX will be incomplete in Release 17. |
| ***Q*** |  |
| ***Clauses affected:*** | 2, 4.X, 5.1, 5.3, 5.10, 6.10 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  |  |
| ***affected:*** |  | **X** |  Test specifications |  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | S4aI221293 -> S4aI221303->S4-220058 |

FIRST CHANGE

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

(SNIPPED)

[P] 3GPP TS 26.531: "Data collection and reporting; General description and architecture".

[Q] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".

[R] 3GPP TS 26.502: "Procedures for the 5G System (5GS); Stage 2".

[S] 3GPP TS 26.512: "5G Media Streaming (5GMS); Protocols".

NEXT CHANGE

## 4.X Data collection and reporting for 5GMS

### 4.X.1 Reference architecture instantiation

The abstract data collection and reporting architecture defined in clause 4 of TS 26.531 [P] and depicted in figure 4.2‑1 of [P] is instantiated in the 5G Media Streaming architecture as shown in figure 4.X.1‑1 and as defined below.



Figure 4.X.1‑1: Data collection and reporting architecture instantiation for 5G Media Streaming

The functional elements in this instantiation are defined as follows:

- The role of the *Application Service Provider* in the abstract architecture is played by the 5GMS Application Provider.

- The *Data Collection AF* for 5G Media Streaming is instantiated in the 5GMS AF.

- The *Direct Data Collection Client* for 5G Media Streaming is instantiated in the Media Session Handler. This takes logical responsibility for the Metrics Collection & Reporting and Consumption Collection & Reporting subfunctions.

- The *Provisioning AF* of the Application Service Provider is not instantiated in the 5GMS architecture. Data collection and reporting is instead provisioned using the procedures defined in the present document.

- The *Indirect Data Collection Client* is not instantiated in the 5GMS architecture. Indirect reporting of UE data relating to 5G Media Streaming is not allowed.

- The role of the *AS* data collection client in the abstract reference architecture is played by 5GMS AS. This may be deployed as a trusted AS within the 5G System or deployed externally.

- The *Event Consumer AF* is instantiated in the 5GMS Application Provider as a consumer of 5G Media Streaming events from the Data Collection AF.

The reference points as defined as follows in this instantiation:

**R1** This reference point is not instantiated in the 5GMS architecture.

**M1** Provisioning of data collection and reporting features in the Data Collection AF.

**R2** This reference point is not instantiated in the 5GMS architecture. Instead, it is logically realised by the combination of the following components:

* Internal interfaces between the Direct Data Reporting Client and its subordinate functions, namely Metrics Collection & Reporting and Consumption Reporting & Reporting;
* Internal interface between the Media Session Handler and its subordinate Direct Data Collection Client function;
* Reference point M5, as defined below;
* Internal interface between the 5GMS AF and its subordinate Data Collection AF function.

**M5** Direct data reporting by the Direct Data Collection Client to the Data Collection AF, via the Media Session Handler and 5GMS AF.

**R3** This reference point is not instantiated in the 5GMS architecture.

**R4** Media streaming access reporting by the 5GMS AS to the Data Collection AF.

**R5** Event exposure by the Data Collection AF to subscribing NWDAF [Q] instances.

**R6** Event exposure by the Data Collection AF to subscribing Event Consumer AF instances in the 5GMS Application Provider.

**R7** This reference point is not instantiated in the 5GMS architecture.

**M6** Configuration of 5GMS-related data reporting by the 5GMS-Aware Application.

**R8** This reference point is not instantiated in the 5GMS architecture.

### 4.X.2 UE data reporting for 5GMS

#### 4.X.2.1 UE data reporting procedures for downlink media streaming

The following UE data reporting procedures are in scope for the instantiation of the abstract data collection and reporting architecture in the downlink 5GMS architecture:

1. The procedures defined in clause 5.5 shall be used by the Direct Data Collection Client embedded in the Media Session Handler to report *QoE metrics for downlink media streaming* to the Data Collection AF instantiated in the 5GMSd AF.

2. The procedures defined in clause 5.6 shall be used by the Direct Data Collection Client embedded in the Media Session Handler to report *consumption of downlink media streaming* to the Data Collection AF instantiated in the 5GMSd AF.

3.- Invocations of the *downlink dynamic policy* procedures defined in clause 5.8 shall be logged by the 5GMSd AF and reported to its subordinate Data Collection AF.

4. Invocations of the *AF-based downlink Network Assistance* procedures defined in clause 5.9.2 shall be logged by the 5GMSd AF and reported to its subordinate Data Collection AF.

5. The procedures defined in clause 5.10.1 and 5.10.2 shall be used by the 5GMSd AS to report *downlink media streaming access* *activity* to the Data Collection AF instantiated in the 5GMSd AF via reference point R4.

#### 4.X.2.2 UE data reporting procedures for uplink media streaming

The following UE data reporting procedures are in scope for the instantiation of the abstract data collection and reporting architecture in the uplink 5GMS architecture:

1. Invocations of the *AF-based uplink Network Assistance* procedures defined in clause 6,5 shall be logged by the 5GMSu AF and reported to its subordinate Data Collection AF.

### 4.X.3 UE data processing for 5GMS

#### 4.X.3.1 UE data processing procedures for downlink media streaming

Editor’s Note: Just a simple list here referencing procedures in clause 5.10.

#### 4.X.3.2 UE data processing procedures for uplink media streaming

Editor’s Note: Just a simple list here referencing procedures in clause 5.10.

### 4.X.4 Event exposure of 5GMS UE data

#### 4.X.4.1 Event exposure for downlink media streaming UE data

The following types of events are exposed by the Data Collection AF instantiated in the 5GMSd AF:

1. *QoE metrics for downlink media streaming* reported by the Media Session Handler to the Data Collection AF instantiated in the 5GMSd AF.

2. *Consumption of downlink media streaming* reported by the Media Session Handler to the Data Collection AF instantiated in the 5GMSd AF.

3.- Invocations of *downlink dynamic policies* in the 5GMSd AF by the Media Session Handler.

4. Invocations of *AF-based downlink Network Assistance* in the 5GMSd AF by the Media Session Handler.

5. *Downlink media streaming access activity* reported by the 5GMSd AS to the Data Collection AF instantiated in the 5GMSd AF.

High-level procedures for downlink media streaming event exposure are defined in clause 5.10.3 and the use of event exposure service operations is defined in clause 4.X.4.3.

#### 4.X.4.2 Event exposure for uplink media streaming UE data

The following types of events are exposed by the Data Collection AF instantiated in the 5GMSd AF:

1. Invocations of *AF-based uplink Network Assistance* in the 5GMSd AF by the Media Session Handler.

NEXT CHANGE

## 5.1 General

The downlink streaming procedures follow the general high-level workflow depicted in Figure 5.1‑1 below, starting from provisioningandingestsession preparation to the actual content streaming sessions. The **Ingest Session** refers to the time interval during which media content is uploaded to the 5GMSd AS. The **Provisioning Session** refers to the time interval during which the 5GMSd Client can access the media content and the 5GMSd Application Provider can control and monitor the media content and its delivery. Interactions between the 5GMSd AF and the 5GMSd Application Provider may occur at any time while the Provisioning Session is active.



Figure 5.1-1: High Level Procedure for downlink streaming

The 5GMSd provisioning API at M1d allows selection of media session handling (M5d) and media streaming (M4d) options, including whether the media content is hosted on trusted 5GMSd AS instances. The selection of provisioned 5GMSd features is captured in a Provisioning Session (see clause 5.3) that is uniquely identified in the 5GMS System by a Provisioning Session identifier. The Provisioning Session information may include Content Hosting Configurations, Content Preparation Templates, Server Certificates, Policy Templates, a Consumption Reporting Configuration and Metrics Reporting Configurations.

The Consumption Reporting and/or Metrics Reporting Configuration information provisioned over M1d and passed to the 5GMSd Client by the 5GMSd AF over M5d determines the UE data to be collected by the 5GMSd Client and subsequently reported to the 5GMSd AF. The 5GMSd Application Provider is additionally able to provision data processing instructions for subsequent manipulation by the 5GMSd AF of UE data, whether reported by the 5GMSd Client or otherwise obtained, and rules for restricting the subsequent exposure by the 5GMSd AF of UE data to event consumers including the NWDAF [Q] and/or the 5GMSd Application Provider.

The 5GMSd AF selects the M5d interface features according to the provisioning option. The Media Session Handling interface exposed by the 5GMSd AF can be used for core session handling; configuring content consumption measurement, logging, collection and reporting; configuring QoE metrics measurement, logging collection and reporting; requesting different policy and charging treatments; or 5GMSd AF-based Network Assistance.

When the media content is hosted by trusted 5GMSd AS instances, then the 5GMSd AF selects and configures the 5GMSd AS. Interactions between a 5GMSd AF and a 5GMSd AS (M3d interactions) take place for content hosting configuration, including 5GMS Ingest (M2d) and Media Streaming (M4d) resource reservations. The 5GMSd AS allocates M2d and M4d resources and communicates resource identifiers back to the 5GMSd AF. The 5GMSd AF provides information about the provisioned resources (in form of resource identifiers) for Media Session Handling (M5d), the 5GMSd Ingest (M2d) and the Media Streaming (M4d), to the 5GMSd Application Provider. The resource identifiers for Media Session Handling and Media Streaming are needed by the 5GMSd Client to access the 5GMSd functions.

When Content Hosting is provided by a 5GMSd AS in the external DN, then the M3d interface is not used and the 5GMSd AF does not provide 5GMS Ingest (M2d) and Media Streaming (M4d) resource reservations. M3d procedures are not standardized.

5GMSd Clients can (in principle) start streaming media as soon as the corresponding content is ingested by activating a unicast downlink streaming session. However, it may take some time until the media content is available for Media Streaming (via the Media Streaming API) or the distribution availability might be based on a provisioned schedule. The unicast downlink streaming session for a given UE (or "for each UE") is active from the time at which the 5GMSd-Aware Application activates the reception of a streaming service until its termination.

The 5GMSd-Aware Application receives application data from the 5GMSd Application Provider before receiving the downlink streaming media. The application data contains Service Access Information, which acts as an entry point for the 5GMSd Client to start the downlink streaming session. The 5GMSd Client may either receive a reference to that Service Access Information or the full Service Access Information from the 5GMSd Application Provider.

(SNIPPED – NO FURTHER CHANGES TO THIS CLAUSE)

NEXT CHANGE

## 5.3 Provisioning Session for Media Streaming

### 5.3.1 Domain model

The M1d baseline domain model is depicted in Figure 5.3.1-1 overleaf. It consists of a Provisioning Session, which contains at least one of the following:

- A Content Hosting Configuration,

- A Consumption Reporting Configuration which defines consumption measurement, logging, collection and reporting functionality,

- A Policy Template,

- A Metrics Reporting Configuration which defines QoE metrics measurement, logging, collection and reporting functionality,

- A Data Processing Configuration which contains data manipulation instructions to be performed on UE data by the Data Collection AF including, but not limited to, reporting format conversion, data normalisation, domain-specific anonymisation of data and (dis)aggregation of data into exposed events, or

- A Data Exposure Restriction Configuration which contains one or more access profiles, each of which defines a specific access level for controlling the event information obtainable by the event exposure consumer.

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

When a certain 5GMS feature is selected, the 5GMSd AF compiles the resulting Service Access Information so that the 5GMSd Client can access the services via M4d and/or M5d.



Editor’s note: TODO: Update this figure in accordance with the additional configuration resources defined above once the stage 2 design in TS 26.531 is agreed.

Figure 5.3.1-1: M1d provisioning domain model

### 5.3.2 Baseline provisioning procedure

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

NOTE 1: SLA negotiations between the 5GMSd 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 5.3.2-1: High Level Procedure for provisioning the 5GMS System for downlink streaming sessions

Steps:

1. The 5GMSd Application Provider discovers the address (URL) of the 5GMSd AF (M1d) for Session Provisioning.

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

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

4. The 5GMSd Application Provider specifies one or more 5GMSd features in the Provisioning Session. A set of authorized features is activated, such as content consumption measurement, logging, collection and reporting; QoE metrics measurement, logging, collection and reporting; dynamic policy; network assistance; and content hosting (including ingest).

When the content hosting feature is offered and selected, the 5GMS Application Provider configures the content hosting behaviour of the 5GMSd AS. This Content Hosting Configuration is specified in clause 5.4 and includes selecting the ingest protocol and format, caching and proxying of media objects, content preparation, access protection (e.g. URL signing) and indicating a target distribution area (e.g. through geofencing).

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

When the content consumption measurement, logging, collection and reporting feature is offered and selected, the 5GMSd Application Provider indicates the desired reporting interval. When the 5GMSd Application Provider has delegated Service Access Information handling to the 5GMS System, then location reporting is also selected or de-selected.

When the QoE metrics measurement, logging, collection and reporting feature is offered and selected, the 5GMSd Application Provider provides configuration input on the QoE post processing. When the 5GMSd Application Provider has delegated Service Access Information handling to the 5GMS System, then more detailed metrics reporting is configured.

5. When content hosting is desired, the 5GMSd AF interacts with the 5GMSd AS to allocate M2d resources and configure the ingest format. Then the 5GMSd AS responds with the M2d address. The 5GMSd AF selects the desired ingest format.

6. The 5GMSd AF compiles the Service Access Information. The Service Access Information contains access details and options such as the Provisioning Session identifier, M5d (Media Session Handling) addresses for content consumption reporting, QoE metrics reporting, dynamic policy, network assistance, etc. When content hosting is offered and has been selected in step 4, then also M4d (Media Streaming) information such as the DASH MPD is included.

7. The 5GMSd AF provides the results to the 5GMSd Application Provider.

a. When the 5GMSd Application Provider has selected full Service Access Information, then the results are provided in the form of addresses and configurations for M2d (Ingest), M5d (Media Session Handling) and M4d (Media Streaming).

b. When the 5GMSd 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 5GMSd AF.

8. When content hosting is offered and has been selected in step 4, the 5GMSd Application Provider can start supplying content at the M2d ingest interface. In the case of progressive download or on-demand DASH sessions, the 5GMSd Application Provider makes the content assets available. In the case of Live DASH streaming sessions, the 5GMSd Application Provider starts supplying the live content.

9. The 5GMSd Application Provider executes Service Announcement and updates the UEs (during the lifetime of the Provisioning Session).

Optional:

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

Depending on the parameters of the Provisioning Session:

11. The 5GMSd AF may send event-related or periodic notifications to the 5GMSd Application Provider.

According to schedule, or upon request:

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

13. The 5GMSd AF sends a notification upon Provisioning Session termination.

The 5GMSd AF may request the creation or reuse of one or more network slices for distributing the content of the provisioned session. If more than one network slice is provisioned for the distribution of the content of a session, the list of allowed S‑NSSAIs shall be conveyed to the target UEs (e.g. through URSP or through M5d or M8d).

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

NEXT CHANGE

## 5.10 Procedures for downlink media streaming data collection and reporting

### 5.10.1 Configuration of 5GMSd AS data collection client for downlink media streaming access reporting

The 5GMSd AS obtains its data collection client configuration at reference point R4 as part of its initialisation procedure, as shown in figure 5.10.1‑1.



Figure 5.10.1‑1: Data collection client configuration
for downlink media streaming access reporting

The 5GMSd AS shall periodically refresh its data collection client configuration and act appropriately on any changes in the configuration.

### 5.10.2 Downlink media streaming access reporting by 5GMSd AS

The 5GMSd AS shall use the procedure shown in figure 5.10.2‑1 to report downlink media streaming access to the Data Collection AF instantiated in the 5GMSd AF when the data collection client configuration obtained using the procedure in clause 5.10.1 indicates that it should do so.



Figure 5.10.2‑1: Downlink media streaming access reporting

The data report defined in clause 4.6.1 of TS 26.531 [P] shall be used by the 5GMSd AS to report the activity of downlink media streaming access by the Media Player. Each downlink access logged by the 5GMSd AS in relation to such activity shall be reported as a single record in a report submitted to the Data Collection AF at reference point R4.

### 5.10.3 Downlink media streaming event exposure



Figure 5.10.3‑1: Downlink media streaming event exposure

The 5GMS System shall follow the procedures for event reporting defined in clause 4.15.1 of TS 23.502 [R]. In the context of downlink media streaming:

- The role of *event provider NF* (also referred to in [R] as *event provider NF*, *event provider*, or *NF producer*) is performed by the 5GMSd AF and its subordinate Data Collection AF or the NEF.

- The role of *event consumer NF* (also referred to in [R] as *consumer NF*, *NF service consumer*, or *NF consumer*) is performed by the NWDAF, the NEF and/or the Event Consumer AF of the 5GMSd Application Provider.

When one of the abovementioned event consumer entities subscribes to event reporting at the 5GMSd AF:

- Event reporting processing instructions contained in Event Reporting Information (such as maximum number of reports, maximum duration of reporting, sampling ratio, partitioning criteria, etc.) shall be limited or superseded by similar or identical rules optionally set by a 5GMSd Application Provider in the Data Processing Configuration of the 5GMSd AF Provisioning Session, as described in clause 5.3.1 of the present document and as further specified in clause 4.Y of TS 26.512 [S].

- UE targeting rules contained in the Target of Event Reporting shall be limited or superseded by similar or identical rules optionally set by a 5GMSd Application Provider in the Data Exposure Restriction Configuration of the 5GMSd AF Provisioning Session, as described in clause 5.3.1 of the present document and as further specified in clause 4.Y of TS 26.512 [S].

NEXT CHANGE

## 6.10 Procedures for uplink media streaming data collection and reporting

### 6.10.1 Configuration of 5GMSu AS data collection client for uplink media streaming access reporting

The 5GMSu AS obtains its data collection client configuration at reference point R4 as part of its initialisation procedure, as shown in figure 6.10.1‑1.



Figure 6.10.1‑1: Data collection client configuration
for uplink media streaming access reporting

The 5GMSu AS shall periodically refresh its data collection client configuration and act appropriately on any changes in the configuration.

### 6.10.2 Uplink media streaming access reporting by 5GMSu AS

The 5GMSu AS shall use the procedure shown in figure 6.10.2‑1 to report uplink media streaming access to the Data Collection AF instantiated in the 5GMSu AF when the data collection client configuration obtained using the procedure in clause 6.10.1 indicates that it should do so.



Figure 6.10.2‑1: Uplink media streaming access reporting

The data report defined in clause 4.6.1 of TS 26.531 [P] shall be used by the 5GMSu AS to report the activity of uplink media streaming access by the Media Streamer. Each uplink access logged by the 5GMSu AS in relation to such activity shall be reported as a single record in a report submitted to the Data Collection AF at reference point R4.

### 6.10.3 Uplink media streaming event exposure



Figure 6.10.3‑1: Uplink media streaming event exposure

The 5GMS System shall follow the procedures for event reporting defined in clause 4.15.1 of TS 23.502 [R]. In the context of uplink media streaming:

- The role of *event provider NF* (also referred to in [R] as *event provider NF*, *event provider*, or *NF producer*) is performed by the 5GMSu AF and its subordinate Data Collection AF.

- The role of *event consumer NF* (also referred to in [R] as *consumer NF*, *NF service consumer*, or *NF consumer*) is performed by the NWDAF, the NEF and/or the Event Consumer AF of the 5GMSd Application Provider.

When one of the abovementioned event consumer entities subscribes to event reporting at the 5GMSu AF:

- Event reporting processing instructions contained in Event Reporting Information (such as maximum number of reports, maximum duration of reporting, sampling ratio, partitioning criteria, etc.) shall be limited or superseded by similar or identical rules optionally set by a 5GMSu Application Provider in the Data Processing Configuration of the 5GMSu AF Provisioning Session, as described in clause 5.3.1 of the present document and as further specified in clause 5.Y of TS 26.512 [S].

- UE targeting rules contained in the Target of Event Reporting shall be limited or superseded by similar or identical rules optionally set by a 5GMSd Application Provider in the Data Exposure Restriction Configuration of the 5GMSd AF Provisioning Session, as described in clause 5.3.1 of the present document and as further specified in clause 5.Y of TS 26.512 [S].

END OF CHANGES