**3GPP TSG- Meeting #124 *S4-230806***

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** | **4** | **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 |  |

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| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** | S4 | | | | | | | | | |
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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 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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The feature of data collection and reporting for Network Assistance allows the reporting only of AF-based Network Assistance usage. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add the data collection and reporting of Network Assistance usage when the UE implements the ANBR-based Network Assistance method. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Data collection and reporting for Network Assistance remains limited to the reporting only of AF-based Network Assistance usage. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.7, D.6 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev - : S4-230243 for SA4 #122.  Rev 1: S4-230323 at SA4 #122, taking the comments from the BBC into account, and merging in S4-230244 (changes in Annex D.6). Known issues still to be covered:   * Downlink and uplink reporting procedures at R2 still to be drafted (in TS 26.531?) * Not directly related correction to figure 4.2.2-2 - change the label “Network Assistance and QoS” to “Network Assistance and QoS, & reporting”   S4-230323 was endorsed at SA4 #122 closing plenary.  Rev 2: S4-230484 for SA4 #123-e – withdrawn  Rev 3: S4aI230101 for MBS SWG ad hoc meeting on 11th May 2023.  Rev 4: S4-230806 for SA4 #124. | | | | | | | | |

## 4.7 Data collection, reporting and exposure for 5GMS

### 4.7.1 Reference architecture instantiation

The abstract data collection and reporting architecture defined in clause 4 of TS 26.531 [22] and depicted in figure 4.2‑1 of TS 26.531 [22] is instantiated in the 5G Media Streaming architecture as shown in figure 4.7.1‑1 and as defined below.



Figure 4.7.1‑1: 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,* *Consumption Collection & Reporting* and *ANBR-based Network Assistance* *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 is outside the scope of 5G Media Streaming.

- 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** Direct data reporting by the Direct Data Collection Client to the Data Collection AF of ANBR-based Network Assistance.

For the provision of Metrics and Consumption reports, R2 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 [23] 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.

### 4.7.2 UE data reporting for 5GMS

#### 4.7.2.1 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 instantiated 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 instantiated 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 5.11.1 and 5.11.2 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.

6. The procedures defined in clause 5.9.4.2 shall be used by the Direct Data Collection Client instantiated in the Media Session Handler to report invocations of the *ANBR-based downlink Network Assistance* procedures to the Data Collection AF instantiated in the 5GMSd AF via reference point R2.

#### 4.7.2.2 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.

2. The procedures defined in clause 5.9.4.2 shall be used by the Direct Data Collection Client instantiated in the Media Session Handler to report invocations of the *ANBR-based uplink Network Assistance* procedures to the Data Collection AF instantiated in the 5GMSu AF via reference point R2.

### 4.7.3 UE data processing for 5GMS

#### 4.7.3.1 UE data processing procedures for downlink media streaming

The following restriction dimensions and aggregation functions defined in clause 4.5.2 of TS 26.531 [22] may be provisioned in a Data Access Profile as part of a 5GMSd Provisioning Session and shall, as a consequence, be applied to reported UE data prior to exposing it to event consumers.

Table 4.7.3.1‑1: Valid processing of downlink media streaming UE data by the Data Collection AF

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Restriction dimension | | | Aggregation function | | | | | |
|  | Time | User | Location | None | Count | Mean | Maximum | Minimum | Sum |
| QoE metrics for downlink media streaming | Yes | Yes | Yes | Yes | Yes  (NOTE 1) | Yes  (NOTE 1) | Yes  (NOTE 1) | Yes  (NOTE 1) | Yes  (NOTE 1) |
| Consumption of downlink media streaming | Yes | Yes | Yes | Yes | Yes  (NOTE 2) | No | No | No | No |
| Downlink dynamic policy invocations | Yes | Yes | Yes | Yes | Yes  (NOTE 3) | No | No | No | No |
| AF-based downlink Network Assistance invocations | Yes | Yes | Yes | Yes | Yes  (NOTE 3) | No | No | No | No |
| ANBR-based downlink Network Assistance invocations | Yes | Yes | Yes | Yes | Yes  (NOTE 3) | Yes  (NOTE 4) | Yes  (NOTE 4) | Yes  (NOTE 4) | No |
| Downlink media streaming access activity | Yes | Yes | Yes | Yes | Yes  (NOTE 2) | No | No | No | No |
| NOTE 1: Aggregation functions applied individually to all exposed metrics within the scope of the applicable restriction dimension(s).  NOTE 2: Number of downlink media streaming sessions within the scope of the applicable restriction dimension(s).  NOTE 3: Number of invocations within the scope of the applicable restriction dimension(s). | | | | | | | | | |

#### 4.7.3.2 UE data processing procedures for uplink media streaming

The following restriction dimensions and aggregation functions defined in clause 4.5.2 of TS 26.531 [22] may be provisioned in a Data Access Profile as part of a 5GMSu Provisioning Session and shall, as a consequence, be applied to reported UE data prior to exposing it to event consumers.

Table 4.7.3.2‑1: Valid processing of uplink media streaming UE data by the Data Collection AF

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Restriction dimension | | | Aggregation function | | | | | |
|  | Time | User | Location | None | Count | Mean | Maximum | Minimum | Sum |
| AF-based uplink Network Assistance invocations | Yes | Yes | Yes | Yes | Yes  (NOTE 1) | No | No | No | No |
| ANBR-based uplink Network Assistance invocations | Yes | Yes | Yes | Yes | Yes  (NOTE 1) | Yes  (NOTE 2) | Yes  (NOTE 2) | Yes  (NOTE 2) | No |
| NOTE: Number of invocations within the scope of the applicable restriction dimension(s). | | | | | | | | | |

### 4.7.4 Event exposure of 5GMS UE data

#### 4.7.4.1 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.

6. *ANBR-based downlink Network Assistance* reported by the Media Session Handler to the Data Collection AF instantiated in the 5GMSd AF.

High-level procedures for downlink media streaming event exposure are defined in clause 5.11.3.

#### 4.7.4.2 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.

2. *ANBR-based uplink Network Assistance* reported by the Media Session Handler to the Data Collection AF instantiated in the 5GMSu AF.

High-level procedures for uplink media streaming event exposure are defined in clause 6.8.3.

### 5.9.4 UE data reporting of Network Assistance invocations

#### 5.9.4.1 UE data reporting of AF-based Network Assistance invocations

##### 5.9.4.1.1 General

Invocations of AF-based Network Assistance by the Media Session Handler are logged by the 5GMS AF and these logs are passed to the subordinate Data Collection AF for both downlink and uplink media streaming sessions according to the configuration…, during active AF-based Network Assistance sessions.

##### 5.9.4.1.2 Reporting procedure

Figure 5.9.4-1: AF-based Network Assistance metrics reporting

##### 5.9.4.1.3 Reporting parameters

The reported metrics are:

- Network Assistance bit rate recommendation invocation count.

- Minimum media stream bit rate that was allocated during the Network Assistance session.

- Maximum media stream bit rate that was allocated during the Network Assistance session.

- Mean media stream bit rate that was allocated during the Network Assistance session.

- Network Assistance boost request invocation count.

#### 5.9.4.2 UE data reporting of ANBR-based Network Assistance invocations

##### 5.9.4.2.1 General

Invocations of ANBR-based Network Assistance by the Media Session Handler are reported by the ANBR-based Network Assistance Collection & Reporting subfunction of the Direct Data Collection Client to the Data Collection AF for downlink or uplink media streaming sessions according to the configuration…

##### 5.9.4.2.2 Reporting procedure

Figure 5.9.4-2: ANBR-based Network Assistance metrics reporting

##### 5.9.4.2.3 Reporting parameters

The reported metrics are:

- Network Assistance invocation count.

- Minimum media stream bit rate that was allocated during the Network Assistance session.

- Maximum media stream bit rate that was allocated during the Network Assistance session.

- Mean media stream bitrate that was allocated during the Network Assistance session.

# D.6 Invocation of Network Assistance

The AF-based Network Assistance feature enables a UE to receive a bit rate recommendation from a 5GMS AF providing the Network Assistance server function.

The 5GMS AF uses the Npcf\_PolicyAuthorization notification or Nnef\_MonitoringEvent procedure to receive notifications of network QoS changes, e.g. estimation of throughput, recommendation of a bit rate. The 5GMS AF receives these policy change notifications asynchronously.

The 5GMS AF reports the invocation of AF-based network assistance to its subordinate Data Collection AF, including information about requested QoS and recommended QoS. The Data Collection AF subsequently exposes this UE data to the Event Consumer AF within the 5GMS Application Provider. Using this information, the 5GMS Application Provider is able to optimise the use of the 5GMS System, e.g. by performing dynamic congestion window adjustment.

Data collection and reporting may also be used in case the UE implements ANBR-based Network Assistance. In this case the Direct Data Reporting Client reports invocats of ANBR-based Network Assistance directly to the 5GMS AF’s subordinate Data Collection AF.

The NWDAF subscribes to events of this type at the Data Collection AF, specifying the relevant application filter and any relevant location and/or user filters. Based on the requested QoS and recommended QoS in the exposed events, the NWDAF analyses whether the current network deployment or status can support the currently provisioned media streaming services, and exposes these results to the OAM for better network optimization.