**3GPP TSG-SA4 Meeting #125 *S4-231211***

**Goteborg, Sweden, 21st Aug 2023 - 25th Aug 2023**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **26.512** | **CR** | **0048** | **rev** | **-** | **Current version:** | **17.5.0** |  |
|  | | | | | | | | |
| *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:*** | [5GMS\_Pro\_Ph2] 5GMS over MBS and 5GMS hybrid services | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Qualcomm Incorporated | | | | | | | | | |
| ***Source to TSG:*** | S4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5GMS\_Pro\_Ph2 | | | | |  | ***Date:*** | | | 2023-08-14 |
|  |  | | | |  | |  | | |  |
| ***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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | In TR 26.804 and TS 26.501, 5GMS over 5MBS and 5GMS hybrid services (5MBS and 5GMS) are introduced. Added call flows and procedures to support carriage of 5GMS streaming sessions over 5MBS.  The work item objectives state  3) Stage 3 support for 5GMS over MBS and 5GMS hybrid services as defined in TS 26.501 and based on the conclusions in TR 26.804 and TR 26.802 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Support for MBS-based distribution | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 4.2, 4.3.1, 4.3.6.1, 4.7.4, 4.7.5, 4.X (new), 7.6.3.2, 11.2.3.1. C.3.5, C.4.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

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# 2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

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[X] 3GPP TS 26.517: "5G Multicast-Broadcast User Services; Protocols and Formats".

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## 4.2 APIs relevant to Downlink Media Streaming

Table 4.2‑1 summarises the APIs used to provision and use the various downlink media streaming features specified in TS 26.501 [2].

Table 4.2‑1: Summary of APIs relevant to downlink media streaming features

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 5GMSd feature | Abstract | Relevant APIs | | |
| Interface | API name | Clause |
| Content protocols discovery | Used by the 5GMSd Application Provider to interrogate which content ingest protocols are supported by 5GMSd AS(s). | M1d | Content Protocols Discovery API | 7.5 |
| Content hosting | Content is ingested, hosted and distributed by the 5GMSd AS according to a Content Hosting Configuration associated with a Provisioning Session. | M1d | Provisioning Sessions API | 7.2 |
| Server Certificates Provisioning API | 7.3 |
| Content Preparation Templates Provisioning API | 7.4 |
| Content Hosting Provisioning API | 7.6 |
| M2d | HTTP-pull based content ingest protocol | 8.2 |
| DASH-IF push based content ingest protocol | 8.3 |
| M4d | DASH [4] or 3GP [37] | 10 |
| M5d | Service Access Information API | 11.2 |
| Metrics reporting | The 5GMSd Client uploads metrics reports to the 5GMSd AF according to a provisioned Metrics Reporting Configuration it obtains from the Service Access Information for its Provisioning Session. | M1d | Provisioning Sessions API | 7.2 |
| Metrics Reporting Provisioning API | 7.8 |
| M5d | Service Access Information API | 11.2 |
| Metrics Reporting API | 11.4 |
| Consumption reporting | The 5GMSd Client provides feedback reports on currently consumed content according to a provisioned Consumption Reporting Configuration it obtains from the Service Access Information for its Provisioning Session. | M1d | Provisioning Sessions API | 7.2 |
| Consumption Reporting Provisioning API | 7.7 |
| M5d | Service Access Information API | 11.2 |
| Consumption Reporting API | 11.3 |
| Dynamic Policy invocation | The 5GMSd Client activates different traffic treatment policies selected from a set of Policy Templates configured in its Provisioning Session. | M1d | Provisioning Sessions API | 7.2 |
| Policy Templates Provisioning API | 7.9 |
| M5d | Service Access Information API | 11.2 |
| Dynamic Policies API | 11.5 |
| Network Assistance | The 5GMSd Client requests bit rate recommendations and delivery boosts from the 5GMSd AF. | M5d | Service Access Information API | 11.2 |
| Network Assistance API | 11.6 |
| Edge content processing | Edge resources are provisioned for processing content in 5GMS downlink media streaming sessions. | M1d | Provisioning Sessions API | 7.2 |
|  | Edge Resources Provisioning API | 7.10 |
| M5d | Service Access Information API | 11.2 |
| 5GMS via eMBMS | The 5GMSd AF provisions the delivery of content via eMBMS. | M1d | Provisioning Sessions API | 7.2 |
| M5d | Service Access Information API | 11.2 |
| M4d | DASH [4] or 3GP [37] or HLS | 10 |
| UE data collection, reporting and exposure | UE data related to downlink 5G Media Streaming is reported to the Data Collection AF instantiated in the 5GMSd AF for exposure to Event consumers. | M1d | Event Data Processing Provisioning API | 7.11 |
| R4 | Ndcaf\_DataReporting service | 17 |
| R5, R6 | Naf\_EventExposure service | 18 |
| 5GMS via MBS | The 5GMSd AF provisions the delivery of content via MBS User Services. | M1d | Provisioning Sessions API | 7.2 |
| M5d | Service Access Information API | 11.2 |
| M4d | DASH [4] or 3GP [37] or HLS | 10 |

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### 4.3.1 General

A 5GMS Application Provider may use the procedures in this clause to provision the network for media streaming sessions that are operated by that 5GMS Application Provider. For downlink media streaming, these sessions may be DASH streaming sessions, progressive download sessions, or any other type of media streaming or distribution (e.g. HLS) sessions. For uplink media streaming, the content format and delivery protocol are defined by the 5GMSu Application Provider, and may be either non-fully standardized or employ standardized HTTP-based streaming of ISO BMFF content fragments as profiled by CMAF [39].

The M1 interface offers three different sets of procedures:

- For downlink media streaming, configuration of content ingest at M2d for onward distribution by the 5GMSd AS over M4d or via other distribution systems such as eMBMS or MBS: designed as an API that is equivalent to the functionality of a public CDN. For uplink media streaming, configuration of content egest at M2u for the media content received by the 5GMSu AS from the 5GMSu Client over M4u. The resource types involved in content hosting configuration are provisioning session (see clause 4.3.2), content hosting procedures (see clause 4.3.3), ingest protocols (see clause 4.3.4), content preparation template (see clause 4.3.5), and server certificates (see clause 4.3.6).

- Configuration of dynamic policies: allows the configuration of Policy Templates at M5 that can be applied to M4 downlink/uplink media streaming sessions.

- Configuration of reporting: permits the MNO to collect, at M5, QoE metrics and consumption reports about M4 downlink sessions, as well as permits the MNO to collect, at M5, QoE metrics reports about M4 uplink sessions.

A 5GMS Application Provider may use any of these procedures, in any combination, to support its media streaming sessions.

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#### 4.3.6.1 General

Each X.509 server certificate [8] presented by the 5GMSd AS at reference point M4d or at reference point xMB-U is represented by a Server Certificate resource at M1d. The Server Certificates Provisioning API as specified in clause 7.3 enables a Server Certificate resource to be created within the scope of a Provisioning Session, and subsequently referenced by a Content Hosting Configuration created in the scope of the same Provisioning Session. That API supports two alternative provisioning methods for Server Certificate resources: one in which a certificate is generated by the 5GMS System operator on behalf of the 5GMSd Application Provider; the other in which a certificate is generated by the 5GMSd Application Provider from a Certificate Signing Request solicited from the 5GMSd AF. Both methods shall be supported by implementations of the 5GMSd AF.

NOTE: As a consumer of media from the 5GMSd AS in a combined architecture using 5GMS and eMBMS, the BMSC needs to be able to trust the content it is receiving comes from a bona fide source. This issue is left to implementation. Likewise, in the case of a combined architecture using 5GMS and MBS, the MBSTF needs to be able to trust the content it ingests.

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#### 4.7.2.1 General

Service Access Information is the set of parameters and addresses needed by the 5GMSd Client to activate reception of a downlink media streaming session or by a 5GMSu Client to activate an uplink media streaming session for contribution. The data model of the ServiceAccessInformation resource acquired by the Media Session Handler of the 5GMS Client is shown in clause 11.2.3. Service Access Information additionally includes configuration information to allow the Media Session Handler to invoke procedures for dynamic policy (see clause 4.7.3), consumption reporting (clause 4.7.4), metrics reporting (clause 4.7.5) and network assistance (clause 4.7.6).

For downlink media streaming, the Media Session Handler may obtain Service Access Information from either the 5GMSd-Aware Application (via M6d) or the 5GMSd AF (via M5d). In the former case, the Service Access Information is initially acquired by the 5GMSd-Aware Application from the 5GMSd Application Provider via M8d. In the latter case, the Service Access Information is derived by the 5GMSd AF from the Provisioning Session established via M1d.

Typically, the Service Access Information for downlink media streaming includes a media entry point (e.g. a URL to a DASH MPD or a URL to a progressive download file) that can be consumed by the Media Player and is handed to the Media Player through M7d.

If an Edge Resources Configuration with client-driven management (EM\_CLIENT\_DRIVEN) is provisioned in the applicable Provisioning Session, the 5GMSd AF shall convey the ClientEdgeResources‌Configuration to the Media Session Handler (via M5d) as part of the Service Access Information.

NOTE: The requirements on an edge-enabled Media Session Handler are defined in clause 4.5.2 of TS 26.501 [2].

For downlink media streaming exclusively via eMBMS and for hybrid 5GMSd/eMBMS services as defined in clauses 5.10.2 and 5.10.5 respectively of TS 26.501 [2], the Service Access Information indicates that the 5GMSd Client acts as an MBMS-Aware Application.

For dynamically provisioned downlink media streaming via eMBMS as defined in clause 5.10.6 of TS 26.501 [2], the 5GMSd AS creates a presentation manifest that is regularly polled by the Media Player for a potential update. When an eMBMS User Service carrying the 5GMSd content is dynamically provisioned or removed by the 5GMSd AF, the 5GMSd AS shall update the presentation manifest with the locations where the updated manifest and the media segments are now available, for example to add or change to the media server in the MBMS Client.

For downlink media streaming exclusively via MBS and for hybrid 5GMSd/MBS services as defined in clauses 5.12.2 and 5.12.4 respectively of TS 26.501 [2], the Service Access Information indicates that the 5GMSd Client acts as an MBS-Aware Application.

For dynamically provisioned downlink media streaming via MBS as defined in clause 5.12.4 of TS 26.501 [2], the 5GMSd AS creates a presentation manifest that is regularly polled by the Media Player for a potential update. When an MBS User Service carrying the 5GMSd content is dynamically provisioned or removed by the 5GMSd AF, the 5GMSd AS shall update the presentation manifest with the locations where the updated manifest and the media segments are now available, for example to additionally or alternatively point to the Media Server in the MBSTF Client.

For uplink media streaming, the 5GMSu Client may obtain Service Access Information from either the 5GMSu-Aware Application (via M6u/M7u) or the 5GMSu AF (via M5u). In the former case, the Service Access Information is initially acquired by the 5GMSu-Aware Application from the 5GMSu Application Provider via M8u. In the latter case, the Service Access Information is derived by the 5GMSu AF from the Provisioning Session established via M1u.

This clause specifies the procedures whereby the 5GMS Client fetches Service Access Information from the 5GMS AF.

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### 4.7.4 Procedures for consumption reporting

These procedures are used by the Media Session Handler and the Consumption Reporting functions of the 5GMSd Client to submit a consumption report via the M5d interface if Consumption Reporting is applied for a downlink streaming session.

The Service Access Information indicating whether Consumption Reporting is provisioned for downlink streaming sessions is described in clause 11.2.3. When the clientConsumptionReportingConfiguration.samplePercentage value is 100, the Media Session Handler shall activate the consumption reporting procedure. If the samplePercentage is less than 100, the Media Session Handler shall generate a random number which is uniformly distributed in the range of 0 to 100, and the Media Session Handler shall activate the consumption report procedure when the generated random number is of a lower value than the samplePercentage value.

If the consumption reporting procedure is activated, the Media Session Handler shall submit a consumption report to the 5GMSd AF when any of the following conditions occur:

- Start of consumption of a downlink streaming session;

- Stop of consumption of a downlink streaming session;

- Upon determining the need to report ongoing 5GMS consumption at periodic intervals determined by the clientConsumptionReportingConfiguration.reportingInterval property.

- Upon determining a location change, if the clientConsumptionReportingConfiguration.locationReporting property is set to True.

- Upon determining an access network change (e.g. unicast to eMBMS/MBS, or *vice versa*), if the clientConsumptionReportingConfiguration.accessReporting property is set to True.

Whenever a consumption report is sent, the Media Session Handler shall reset its reporting interval timer to the value of the reportingInterval property and it shall begin countdown of the timer again. Whenever the Media Session Handler stops the consumption of a downlink streaming session, it shall disable its reporting interval timer.

In order to submit a consumption report, the Media Session Handler shall send an HTTP POST message to the 5GMSd AF. If several 5GMSd AF addresses are listed in the clientConsumptionReportingConfiguration.‌serverAddresses array (see table 11.2.3.1-1), the Media Session Handler shall choose one and send the message to the selected. The request body shall be a ConsumptionReport structure, as specified in clause 11.3.3.1.The server shall respond with a 200 (OK) message to acknowledge successful processing of the consumption report.

NOTE: If the connection via M5d for consumption reporting is temporarily unavailable, the consumption reports are expected to be stored on the UE for some time until connectivity to 5GMSd AF is restored and send as collection later to the 5GMSd AF. Details are left to implementation.

The Consumption Reporting API, defining the data formats and structures and related procedures for consumption reporting, is described in clause 11.3.

A reporting client identifier shall be included in the consumption report. If available to the Media Session Handler, its value should be a GPSI value as defined by TS 23.003 [7]. Otherwise, the reporting client identifier should be represented by a stable and globally unique string.

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### 4.7.5 Procedures for metrics reporting

The M5 procedures for QoE metrics reporting pertain to the combination of the provisioning of metrics collection and reporting in the Media Session Handler using relevant Service Access Information, and the sending of collected metrics by the Media Session Handler to the 5GMS AF in accordance with the configured metrics scheme(s). A metrics scheme may be 3GPP-defined or non-3GPP-defined.

When the metrics collection and reporting feature is activated for a downlink media streaming session, one or more metrics configuration sets, each associated with a metrics scheme, may be provided to the 5GMS Client. A given metrics configuration set contains information such as the 5GMS AF address(es) to which metrics are to be sent by the Media Session Handler, metrics reporting interval, target percentage of media streaming sessions for which reports should be sent, and the set of metrics to be collected and reported. See TS 26.501 [2] for additional details.

For progressive download and DASH streaming services, the listed metrics in a given metrics configuration set are associated with the 3GPP metrics scheme and shall correspond to one or more of the metrics as specified in clauses 10.3 and 10.4, respectively, of TS 26.247 [4]. Metrics related to virtual reality media, as specified in clause 9.3 of TS 26.118 [42] clause 9.3, may also be listed in the metrics configuration. Metrics related to eMBMS delivery, as specified in clause 9.4.6 of TS 26.346 [51], may also be listed in the metrics configuration.

NOTE: If the connection via M5d for metrics reporting is temporarily unavailable, the consumption reports are expected to be stored on the UE for some time until connectivity to 5GMSd AF is restored and send as collection later to the 5GMSd AF. Details are left to implementation.

Details of the metrics reporting API are provided in clause 11.4, and for 3GP-DASH based downlink media streaming services, the 3GPP-defined metrics reporting scheme and metrics report format are defined in clause 11.4.3.

A reporting client identifier may be included in the metrics report. If available to the Media Session Handler, its value should be a GPSI value as defined by TS 23.003 [7]. Otherwise, the reporting client identifier should be represented by a stable and globally unique string.

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## 4.X Procedures for downlink media streaming via MBS

This procedure is used by a 5GMSd Client to establish a downlink media streaming session either completely, or at least partially, through MBS.

- For downlink media streaming exclusively via MBS and for hybrid 5GMSd/MBS services, as defined in clauses 5.12.2 and 5.12.4 respectively of TS 26.501 [2]:

- The 5GMSd Application Provider shall provision a supplementary distribution network of type DISTRIBUTION\_‌NETWORK\_MBS in the Content Hosting configuration at reference point M1d, as specified in clause 7.6.3.1, with either MODE\_EXCLUSIVE or MODE\_HYBRID (as appropriate).

- The 5GMSd Application Provider may additionally provision access reporting in the Consumption Reporting Configuration at M1d, as specified in clause 7.7.3.1.

- The MBSTF Client shall host an MPD as defined in ISO/IEC 23009‑1 [32] or in TS 26.247 [4], or any other presentation manifest such as an HLS Master Playlist, as the 5GMSd Media Entry Point.

- The URL of this presentation manifest shall be signalled to the 5GMSd Client through the 5GMSd session establishment procedure.

- The MBSTF Client shall be invoked by the Media Session Handler via reference point MBS-7 using the procedures defined in TS 26.517 [X].

- For dynamically provisioned downlink media streaming via MBS as defined in clause 5.12.5 TS 26.501 [2]:

- The 5GMSd Application Provider shall provision a supplementary distribution network of type DISTRIBUTION\_‌NETWORK\_MBS in the Content Hosting configuration at reference point M1d, as specified in clause 7.6.3.1, with MODE\_DYNAMIC.

- The 5GMSd Application Provider shall additionally provision access reporting in the Consumption Reporting Configuration at M1d, as specified in clause 7.7.3.1.

- The 5GMSd AS shall host an MPD as defined in ISO/IEC 23009‑1 [32] or in TS 26.247 [4], or any other presentation manifest such as an HLS Master Playlist as the 5GMSd Media Entry Point.

- The URL of this presentation manifest shall be signalled to the 5GMSd Client through the 5GMSd session establishment procedure. If the 5GMSd service is currently available as an MBS User Service, the 5GMSd Client forwards the manifest request to the Media Server in the MBSTF Client via reference point MBS-7; otherwise, it forwards the request to the 5GMSd AS via reference point M4d.

NOTE: The detailed execution of dynamically handling this decision is left to implementation.

- The MBS Client shall be invoked dynamically, paused or destroyed by the Media Session Handler via reference point MBS-7 using the procedures defined in TS 26.517 [X].

Additional procedures for reactions to different HTTP status codes are provided in clause A.7 of TS 26.247 [4] and clause A.7 of ISO/IEC 23009‑1 [32].

Additional procedures for handling partial file responses are provided in clause A.9 of TS 26.247 [4].

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#### 7.6.3.2 DistributionNetworkType enumeration

The data model for the DistributionNetworkType enumeration is specified in Table 7.6.3.2-1 below:

**Table 7.6.3.2‑1: Definition of DistributionNetworkType enumeration**

|  |  |
| --- | --- |
| Enumeration value | Description |
| DISTRIBUTION\_NETWORK\_EMBMS | Downlink media streaming via eMBMS. |
| DISTRIBUTION\_NETWORK\_MBS | Downlink media streaming via MBS. |

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#### 11.2.3.1 ServiceAccessInformation resource type

The data model for the ServiceAccessInformation resource is specified in table 11.2.3.1-1 below. Different properties are present in the resource depending on the type of Provisioning Session from which the Service Access Information is derived (as indicated in the provisioningSessionType property) and this is specified in the Applicability column.

Table 11.2.3.1‑1: Definition of ServiceAccessInformation resource

| Property name | Type | Cardinality | Usage | Description | Applicability |
| --- | --- | --- | --- | --- | --- |
| provisioningSessionId | ResourceId | 1..1 | RO | Unique identification of the M1 Provisioning Session. | All types |
| provisioningSession‌Type | Provisioning‌Session‌Type | 1..1 | RO | The type of Provisioning Session. | All types. |
| streamingAccess | Object | 0..1 | RO |  | downlink |
| entryPoints | Array(M5‌Media‌Entry‌Point) | 0..1 | RO | A list of alternative Media Entry Points for the 5GMS Client to choose between. |
| locator | AbsoluteUrl | 1..1 | RO | A pointer to a document at reference point M2 that defines a media presentation e.g. MPD for DASH content or URL to a video clip file. |
| contentType | String | 1..1 | RO | The MIME content type of this Media Entry Point. |  |
| profiles | Array(Uri) | 0..1 | RO | An optional list of conformance profile URIs with which this Media Entry Point is compliant.  If present, the array shall contain at least one item. |  |
| eMBMS‌Service‌Announcement‌Locator | AbsoluteUrl | 0..1 | RO | A pointer to a document that defines a User Service Announcement for eMBMS where the service announcement file is available. | Downlink |
| mbs‌external‌Service‌Identifier | AbsoluteUrl | 0..1 | RO | The external service identifier of an MBS User Service. | Downlink |
| clientConsumptionReporting‌Configuration | Object | 0..1 | RO |  | downlink |
| reportingInterval | DurationSec | 0..1 | RO | The time interval, expressed in seconds, between consumption report messages being sent by the Media Session Handler. The value shall be greater than zero.  When this property is omitted, a single final report shall be sent immediately after the media streaming session has ended. |
| serverAddresses | Array(AbsoluteUrl) | 1..1 | RO | A list of 5GMSd AF addresses (URLs) where the consumption reporting messages are sent by the Media Session Handler. See NOTE.  Each address shall be an opaque base URL, following the 5GMS URL format specified in clause 6.1 up to and including the {apiVersion} path element. |
| locationReporting | Boolean | 1..1 | RO | Stipulates whether the Media Session Handler is required to provide location data to the 5GMSd AF in consumption reporting messages (in case of MNO or trusted third parties). |
| accessReporting | Boolean | 1..1 | RO | Stipulates whether the Media Session Handler is required to provide consumption reporting messages to the 5GMSd AF when the access network changes during a media streaming session. |
| samplePercentage | Percentage | 1..1 | RO | The percentage of media streaming sessions that shall send consumption reports, expressed as a floating point value between 0.0 and 100.0. |
| dynamicPolicyInvocation‌Configuration | Object | 0..1 | RO |  | downlink,  uplink |
| serverAddresses | Array(AbsoluteUrl) | 1..1 | RO | A list of 5GMSd AF addresses (URLs) which offer the APIs for dynamic policy invocation sent by the Media Session Handler. See NOTE.  Each address shall be an opaque base URL, following the 5GMS URL format specified in clause 6.1 up to and including the {apiVersion} path element. |
| validPolicyTemplateIds | Array(ResourceId) | 1..1 | RO | A list of Policy Template identifiers which the 5GMS Client is authorized to use. |
| sdfMethods | Array(SdfMethod) | 1..1 | RO | 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. |
| externalReferences | Array(String) | 0..1 | RO | Additional identifier for this Policy Template, unique within the scope of its Provisioning Session, that can be cross-referenced with external metadata about the media streaming session.  Example: "HD\_Premium". |
| clientMetricsReporting‌Configurations | Array(Object) | 0..1 | RO |  | downlink,  uplink |
| *metricsReporting‌ConfigurationId* | ResourceId | 1..1 | RO | The identifier of this metrics reporting configuration, unique within the scope of provisioningSessionId.  The value shall be the same as the corresponding identifier provisioned at reference point M1. |
| serverAddresses | Array(AbsoluteUrl) | 1..1 | RO | A list of 5GMS AF addresses to which metrics reports shall be sent. See NOTE.  Each address shall be an opaque base URL, following the 5GMS URL format specified in clause 6.1 up to and including the {apiVersion} path element. |
| scheme | Uri | 1..1 | RO | The metrics reporting scheme that metrics reports shall use (see clause 4.7.5). |
| dataNetworkName | Dnn | 0..1 | RO | The DNN which shall be used when sending metrics reports. If not specified, the name of the default DN shall be used. |
| reportingInterval | DurationSec | 0..1 | RO | The time interval, expressed in seconds, between metrics reports being sent by the Media Session Handler. The value shall be greater than zero.  When this property is omitted, a single final report shall be sent immediately after the media streaming session has ended. |
| samplePercentage | Percentage | 1..1 | RO | The percentage of media streaming sessions that shall report metrics, expressed as a floating point value between 0.0 and 100.0. |
| urlFilters | Array(String) | 0..1 | RO | A non-empty list of URL patterns for which metrics reporting shall be done. The format of each pattern shall be a regular expression as specified in [5].  If not specified, reporting shall be done for all sessions. |
| Metrics | Array(String) | 1..1 | RO | A list of metrics which shall be reported. |
| networkAssistance‌Configuration | Object | 0..1 | RO |  | downlink,  uplink |
| serverAddresses | Array(AbsoluteUrl) | 1..1 | RO | A list of 5GMS AF addresses (URLs) that offer the APIs for 5GMS AF-based Network Assistance, for access by the 5GMSd Media Session Handler. See NOTE.  Each address shall be an opaque URL, following the 5GMS URL format specified in clause 6.1 up to and including the {apiVersion} path element. |
| client‌EdgeResources‌Configuration | Object | 0..1 | RO | Present only for Provisioning Sessions with client-driven edge computing management mode provisioned. | Downlink,  uplink |
| eligibilityCriteria | Edge‌Processing‌Eligibility‌Criteria | 0..1 | RO | Conditions for activating edge resources for media streaming sessions in the scope of this Service Access Information. (See clause 6.4.3.8.) |
| easDiscoveryTemplate | EAS‌Discovery‌Template | 1..1 | RO | A template for the EAS discovery filter that shall be used by the EEC to discover and select a 5GMS EAS instance to serve media streaming sessions in the scope of this Service Access Information. (See clause 11.2.3.2.) |
| easRelocation‌Requirements | M5EAS‌Relocation‌Requirements | 0..1 | RO | EAS relocation tolerance and requirements.  If absent, the EEC shall assume that relocation is tolerated by all 5GMS EAS instances in the scope of this Service Access Information. (See clause 11.2.3.3.) |
| NOTE: In deployments where multiple instances of the 5GMSd AF expose the Media Session Handling APIs at M5, the 5G System may use a suitable mechanism (e.g. HTTP load balancing or DNS resolution) to direct requests to a suitable AF instance. | | | | | |

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

## C.3.5 M1\_ContentHostingProvisioning API

|  |
| --- |
| openapi: 3.0.0  info:    title: M1\_ContentHostingProvisioning    version: 3.0.0    description: |      5GMS AF M1 Content Hosting Provisioning API  *©* 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).      All rights reserved.  tags:    - name: M1\_ContentHostingProvisioning      description: '5G Media Streaming: Provisioning (M1) APIs: Content Hosting Provisioning'  externalDocs:    description: 'TS 26.512 V18.0.0; 5G Media Streaming (5GMS); Protocols'    url: 'https://www.3gpp.org/ftp/Specs/archive/26\_series/26.512/'  servers:    - url: '{apiRoot}/3gpp-m1/v3'      variables:        apiRoot:          default: https://example.com          description: See 3GPP TS 29.512 clause 6.1.  paths:    /provisioning-sessions/{provisioningSessionId}/content-hosting-configuration:      parameters:        - name: provisioningSessionId          in: path          required: true          schema:            $ref: 'TS26512\_CommonData.yaml#/components/schemas/ResourceId'          description: 'The resource identifier of an existing Provisioning Session.'      post:        operationId: createContentHostingConfiguration        summary: 'Create (and optionally upload) the Content Hosting Configuration for the specified Provisioning Session'        requestBody:          description: 'A JSON representation of a Content Hosting Configuration'          required: true          content:            application/json:              schema:                $ref: '#/components/schemas/ContentHostingConfiguration'        responses:          '201':            description: 'Content Hosting Configuration Created'            headers:              Location:                description: 'URL of the newly created Content Hosting Configuration (same as request URL).'                required: true                schema:                  $ref: 'TS26512\_CommonData.yaml#/components/schemas/AbsoluteUrl'      get:        operationId: retrieveContentHostingConfiguration        summary: 'Retrieve the Content Hosting Configuration of the specified Provisioning Session'        responses:          '200':            description: 'Success'            content:              application/json:                schema:                  $ref: '#/components/schemas/ContentHostingConfiguration'          '404':            description: 'Not Found'      put:        operationId: updateContentHostingConfiguration        summary: 'Update the Content Hosting Configuration for the specified Provisioning Session'        requestBody:          description: 'A JSON representation of a Content Hosting Configuration'          required: true          content:            application/json:              schema:                $ref: '#/components/schemas/ContentHostingConfiguration'        responses:          '204':            description: 'Updated Content Hosting Configuration'          '404':            description: 'Not Found'      patch:        operationId: patchContentHostingConfiguration        summary: 'Patch the Content Hosting Configuration for the specified Provisioning Session'        requestBody:          description: 'A JSON representation of a Content Hosting Configuration'          required: true          content:            application/merge-patch+json:              schema:                $ref: '#/components/schemas/ContentHostingConfiguration'            application/json-patch+json:              schema:                $ref: '#/components/schemas/ContentHostingConfiguration'        responses:          '200':            description: 'Patched Content Hosting Configuration'            content:              application/json:                schema:                  $ref: '#/components/schemas/ContentHostingConfiguration'          '404':            description: 'Not Found'      delete:        operationId: destroyContentHostingConfiguration        summary: 'Destroy the current Content Hosting Configuration of the specified Provisioning Session'        responses:          '204':            description: 'Destroyed Content Hosting Configuration'          '404':            description: 'Not Found'      /provisioning-sessions/{provisioningSessionId}/content-hosting-configuration/purge:      parameters:          - name: provisioningSessionId            in: path            required: true            schema:              $ref: 'TS26512\_CommonData.yaml#/components/schemas/ResourceId'            description: A unique identifier of the Provisioning      post:        operationId: purgeContentHostingCache        summary: 'Purge the content of the cache for the Content Hosting Configuration of the specified Provisioning Session'        requestBody:          description: 'The regular expression pattern for resources to purge from the cache'          required: true          content:            application/x-www-form-urlencoded:              schema:                properties:                  pattern:                    description: 'The regular expression'                    type: string        responses:          '200':            # OK            description: 'Content Purged'            content:              application/json:                schema:                  description: 'The aggregate number of cache entries purged in all 5GMSd AS instances distributing content for the requested Provisioning Session.'                  type: integer                  minimum: 1          '204':            # No Content            description: 'No Content Purged'          '404':            # Not Found            $ref: 'TS29571\_CommonData.yaml#/components/responses/404'          '413':            # Payload Too Large            $ref: 'TS29571\_CommonData.yaml#/components/responses/413'          '414':            # URI Too Long            $ref: 'TS29571\_CommonData.yaml#/components/responses/414'          '415':            # Unsupported Media Type            $ref: 'TS29571\_CommonData.yaml#/components/responses/415'          '422':            # Unprocessable Entity (e.g. syntactically invalid regular expression in request body)            description: 'Unprocessable Entity'            content:              application/problem+json:                schema:                  $ref: 'TS29571\_CommonData.yaml#/components/schemas/ProblemDetails'          '500':            # Internal Server Error            $ref: 'TS29571\_CommonData.yaml#/components/responses/500'          '503':            # Service Unavailable            $ref: 'TS29571\_CommonData.yaml#/components/responses/503'          default:            $ref: 'TS29571\_CommonData.yaml#/components/responses/default'  components:    schemas:      IngestConfiguration:        type: object        description: 'A configuration for content ingest.'        properties:          pull:            type: boolean          protocol:            $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'          baseURL:            $ref: 'TS26512\_CommonData.yaml#/components/schemas/AbsoluteUrl'      M1MediaEntryPoint:        description: "A typed entry point for downlink or uplink media streaming."        type: object        required:          - relativePath          - contentType        properties:          relativePath:            $ref: 'TS26512\_CommonData.yaml#/components/schemas/RelativeUrl'          contentType:            type: string          profiles:            type: array            items:              $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'            minItems: 1      PathRewriteRule:        type: object        description: 'A rule to manipulate URL paths.'        required:          - requestPathPattern          - mappedPath        properties:          requestPathPattern:            type: string          mappedPath:            type: string      CachingConfiguration:        type: object        description: 'A content caching configuration.'        required:          - urlPatternFilter        properties:          urlPatternFilter:            type: string          cachingDirectives:            type: object            required:              - noCache            properties:              statusCodeFilters:                type: array                items:                  type: integer              noCache:                type: boolean              maxAge:                type: integer                format: int32      DistributionConfiguration:        type: object        description: 'A content distribution configuration.'        properties:          entryPoint:            $ref: '#/components/schemas/M1MediaEntryPoint'          contentPreparationTemplateId:            $ref: 'TS26512\_CommonData.yaml#/components/schemas/ResourceId'          canonicalDomainName:            type: string          domainNameAlias:            type: string          baseURL:            $ref: 'TS26512\_CommonData.yaml#/components/schemas/AbsoluteUrl'          pathRewriteRules:            type: array            items:              $ref: '#/components/schemas/PathRewriteRule'          cachingConfigurations:            type: array            items:              $ref: '#/components/schemas/CachingConfiguration'          geoFencing:            type: object            required:              - locatorType              - locators            properties:              locatorType:                $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'              locators:                type: array                items:                  type: string                  description: 'Format of individual locators depends on the locatorType.'                minItems: 1          urlSignature:            type: object            required:              - urlPattern              - tokenName              - passphraseName              - passphrase              - tokenExpiryName              - useIPAddress            properties:              urlPattern:                type: string              tokenName:                type: string              passphraseName:                type: string              passphrase:                type: string              tokenExpiryName:                type: string              useIPAddress:                type: boolean              ipAddressName:                type: string          certificateId:            $ref: 'TS26512\_CommonData.yaml#/components/schemas/ResourceId'          supplementaryDistributionNetworks:            type: array            items:              type: object              description: "A duple tying a type of supplementary distribution network to its distribution mode."              required:                - distributionNetworkType                - distributionMode              properties:                distributionNetworkType:                  $ref: '#/components/schemas/DistributionNetworkType'                distributionMode:                  $ref: '#/components/schemas/DistributionMode'      # Schema for the resource itself      ContentHostingConfiguration:        type: object        description: "A representation of a Content Hosting Configuration resource."        required:          - name          - ingestConfiguration          - distributionConfigurations        properties:          name:            type: string          ingestConfiguration:            $ref: '#/components/schemas/IngestConfiguration'          distributionConfigurations:            type: array            items:              $ref: '#/components/schemas/DistributionConfiguration'      DistributionNetworkType:        description: "Type of distribution network."        anyOf:          - type: string            enum: [NETWORK\_EMBMS,NETWORK\_MBS]          - type: string            description: >              This string provides forward-compatibility with future              extensions to the enumeration but is not used to encode              content defined in the present version of this API.      DistributionMode:        description: "Mode of content distribution."        anyOf:          - type: string            enum: [MODE\_EXCLUSIVE, MODE\_HYBRID, MODE\_DYNAMIC]          - type: string            description: >              This string provides forward-compatibility with future              extensions to the enumeration but is not used to encode              content defined in the present version of this API. |

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

## C.4.1 M5\_ServiceAccessInformation API

|  |
| --- |
| openapi: 3.0.0  info:    title: M5\_ServiceAccessInformation    version: 2.2.1    description: |      5GMS AF M5 Service Access Information API  *©* 2023, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).      All rights reserved.  tags:    - name: M5\_ServiceAccessInformation      description: '5G Media Streaming: Media Session Handling (M5) APIs: Service Access Information'  externalDocs:    description: 'TS 26.512 V17.5.0; 5G Media Streaming (5GMS); Protocols'    url: 'https://www.3gpp.org/ftp/Specs/archive/26\_series/26.512/'  servers:    - url: '{apiRoot}/3gpp-m5/v2'      variables:        apiRoot:          default: https://example.com          description: See 3GPP TS 29.512 clause 6.1.  paths:    /service-access-information/{provisioningSessionId}:      parameters:        - name: provisioningSessionId          description: 'The resource identifier of an existing Provisioning Session.'          in: path          required: true          schema:            $ref: 'TS26512\_CommonData.yaml#/components/schemas/ResourceId'      get:        operationId: retrieveServiceAccessInformation        summary: 'Retrieve the Service Access Information resource'        responses:          '200':            description: 'Success'            content:              application/json:                schema:                    $ref: '#/components/schemas/ServiceAccessInformationResource'          '404':            description: 'Not Found'  components:    schemas:      M5MediaEntryPoint:        description: "A typed entry point for downlink or uplink media streaming."        type: object        required:          - locator          - contentType        properties:          locator:            $ref: 'TS26512\_CommonData.yaml#/components/schemas/AbsoluteUrl'          contentType:            type: string          profiles:            type: array            items:              $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'            minItems: 1      ServerAddresses:        description: "A set of application endpoint addresses."        type: array        items:          $ref: 'TS26512\_CommonData.yaml#/components/schemas/AbsoluteUrl'        minItems: 1      ServiceAccessInformationResource:        description: "A representation of a Service Access Information resource."        type: object        required:        - provisioningSessionId        - provisioningSessionType        properties:          provisioningSessionId:            $ref: 'TS26512\_CommonData.yaml#/components/schemas/ResourceId'          provisioningSessionType:            $ref: 'TS26512\_CommonData.yaml#/components/schemas/ProvisioningSessionType'          streamingAccess:            type: object            properties:              entryPoints:                type: array                items:                  $ref: '#/components/schemas/M5MediaEntryPoint'              eMBMSServiceAnnouncementLocator:                $ref: 'TS26512\_CommonData.yaml#/components/schemas/AbsoluteUrl'              mbsExternalServiceIdentifier:                $ref: 'TS26512\_CommonData.yaml#/components/schemas/AbsoluteUrl'          clientConsumptionReportingConfiguration:            type: object            required:              - serverAddresses              - locationReporting              - samplePercentage            properties:              reportingInterval:                $ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'              serverAddresses:                $ref: '#/components/schemas/ServerAddresses'              locationReporting:                type: boolean              accessReporting:                type: boolean              samplePercentage:                $ref: 'TS26512\_CommonData.yaml#/components/schemas/Percentage'          dynamicPolicyInvocationConfiguration:            type: object            required:              - serverAddresses              - validPolicyTemplateIds              - sdfMethods            properties:              serverAddresses:                $ref: '#/components/schemas/ServerAddresses'              validPolicyTemplateIds:                type: array                items:                  $ref: 'TS26512\_CommonData.yaml#/components/schemas/ResourceId'                minItems: 0              sdfMethods:                type: array                items:                  $ref: 'TS26512\_CommonData.yaml#/components/schemas/SdfMethod'                minItems: 0              externalReferences:                type: array                items:                  type: string                minItems: 1          clientMetricsReportingConfiguration:            type: array            items:              type: object              required:              - serverAddresses              - scheme              - samplePercentage              - urlFilters              - metrics              properties:                serverAddresses:                  $ref: '#/components/schemas/ServerAddresses'                scheme:                  $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'                dataNetworkName:                  $ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'                reportingInterval:                  $ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'                samplePercentage:                  $ref: 'TS26512\_CommonData.yaml#/components/schemas/Percentage'                urlFilters:                  type: array                  items:                    type: string                  minItems: 0                metrics:                  type: array                  items:                    type: string          networkAssistanceConfiguration:            type: object            required:              - serverAddresses            properties:              serverAddresses:                $ref: '#/components/schemas/ServerAddresses'  clientEdgeResourcesConfiguration:            type: object            required:              - easDiscoveryTemplate            properties:              eligibilityCriteria:                $ref: 'TS26512\_CommonData.yaml#/components/schemas/EdgeProcessingEligibilityCriteria'              easDiscoveryTemplate:                $ref: '#/components/schemas/EASDiscoveryTemplate'              easRelocationRequirements:                $ref: '#/components/schemas/M5EASRelocationRequirements'      M5EASRelocationRequirements:        description: 'Relocation requirements of an EAS.'        type: object        required:          - tolerance        properties:          tolerance:            $ref: 'TS26512\_CommonData.yaml#/components/schemas/EASRelocationTolerance'          maxInterruptionDuration:            $ref: 'TS29571\_CommonData.yaml#/components/schemas/UintegerRm'      EASDiscoveryTemplate:        description: 'A template for discovering an EAS instance .'        type: object        required:          - easType          - easProviderIds          - serviceFeatures        properties:          easType:            type: string          easProviderIds:            type: array            items:              type: string          serviceFeatures:            type: array            items:              type: string |