**3GPP TSG- Meeting # *r01***

**, FR, - revision of S4-251517**

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| *CR-Form-v12.3* |
| **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:*** | , Lenovo, Nokia, Huawei, BBC and HiSilicon |
| ***Source to TSG:*** | S4 |
|  |  |
| ***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). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
|  |  |
| ***Reason for change:*** | Lack of support in the Real-Time Media Communications Dynamic Policy API for * Dynamic traffic characterestics (data burst size, time to next burst and expedited transfer indication).
* Media identification and multiplexing
* N6-unmarked PDUs

**Dynamic traffic characterestics**The dynamic traffic characteristics (i.e., data burst size, time to next burst, expedited transfer indication) and associated procedures have been defined in Rel-19 of TS 23.501 as downlink enhancements to support XR media services. Furthermore, TS 26.522 has defined RTP header extensions to transport in user plane at N6 the dynamic traffic characteristics signals originating at the media AS (e.g., Burst Size, BSize, time to next burst, TTNB, and expedited transfer indication, ETI). Yet, TS 26.510 lacks currently RTC media delivery interactions and APIs details/enablers for configuring these dynamic traffic characteristics features and their corresponding indications as envisioned by Stage-2 procedures and architecture of TS 23.501**Media identification and multiplexing**The conclusion of KI#9 and Ki#14 (traffic detection of multiplexed media flows) from TR 26.822 are as below The following aspects are concluded as principles for normative work:- Based on response from SA2, normative work on multiplexed RTP streams may be needed. Furthermore, it is recommended to add guidelines to TS 26.522 [2] for RTP senders that use multiplexing. There may be potential normative aspects to be added to TS 26.510 [50].When multiple RTP media streams are multiplexed in an RTP session, each media stream can be identified using the combination of SSRC, identification-tag (the values of "mid" attribute) in the SDP information, RTP SDES header extension for MID, Payload Type, and RTCP packet type. This media identification information make it possible for an RTP receiver to associate each PDU or PDU Set to a media stream when the the PDUs in a PDU Set carry this information. To enable the traffic detection in 5G System, the Application‌Flow‌Description object defined in clause 7.3.3.2 needs to be updated to include the details of media identification information for the multiplexed streams.***N6-unmarked PDUs enhancements***CR0005 to TS 26.113 updates the RTC Dynamic Policy API, allowing application-defined PSI values for N6-unmarked PDUs rather than relying on UPF pre-configuration. In alignment with this change, TS 26.510 should specify that a Dynamic Policy invoker needs to include the indication of desired PSI for N6-unmarked PDUs in the media transport parameters for downlink PDUs. |
|  |  |
| ***Summary of change:*** | - Complemented dynamic policy provisioning with data burst size, time to next burst and expedited transfer indication marking- Described creation of dynamic policy instance resource when data burst size, time to next burst and expedited transfer indication marking are enabled- Added description of mappings among dynamic traffic characteristics indications and related properties of the MediaComponent property of Npcf\_PolicyAuthorization APIs at N5 reference point- Complemented Policy‌Constraints data model with data burst size, time to next burst and expedited transfer indication marking- Added expedited transfer indication to ClientPolicySpecification data model- Updated with data burst size, time to next burst and expedited transfer indication marking to the Maf\_SessionHandling service access information resource - Updated with dynamic traffic characteristics the dynamic policy resource of the Maf\_SessionHandling service- Added informative details on Media AF mapping of dynamic traffic characteristics features to PCF Npcf\_PolicyAuthrozation APIs.- Updated the application flow description resource to include the media identification information details (*SSRC*, *media stream identifier*, *SDES RTP Header Extension for MID, Payload Type* and *RTCP packet type)*. - Updated the policy control interactions to include mapping among multiplexed media identification information and related properties of the MediaComponent property of Npcf\_PolicyAuthorization APIs at N5 reference point.- Updated Dynamic Policy instance operation to indicate the desired PSI for N6-unmarked PDUs in the media transport parameters for downlink PDUs when PDU Set QoS is desired. |
|  |  |
| ***Consequences if not approved:*** | Recommendations from work item description are not met, key 5GA features are not supported. |
|  |  |
| ***Clauses affected:*** | 5.2.7.1, 5.3.2.1, 5.3.3.2, 5.5.3.3.3 (new), 5.5.3.3.4 (new), 7.3.3.2, 7.3.3.4, 7.3.3.6, 9.2.3.1, 9.3.3.1, A.1, D.1.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 26.113 CR0013TS 26.510 CR0031 |
| ***affected:*** |  | **X** |  Test specifications |  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** | To do:1. Accept removal of square brackets around Time To Next Burst text, if agreeable.
2. Final OpenAPI YAML prototyping and changes will be performed at <https://forge.3gpp.org/rep/sa4/amd-pro-med> once a stable version of this document has been endorsed.
	* The interim delta of the changes for dynamically changing traffic characteristics (not taking into account still the bracketed text on time to next burst indications) is availabe for review at: [REL-19 to dyn\_traffic\_characteristics · SA4 / AMD\_PRO-MED · GitLab](https://forge.3gpp.org/rep/sa4/amd-pro-med/-/compare/REL-19...dyn_traffic_characteristics?from_project_id=9)
	* The delta of changes for multiplex media flows is dependent on stage-3 specification by CT3, to be agreed in August 2025.
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|  |  |
| ***This CR's revision history:*** | CR0034 [S4-251296]: Merged the following endorsed Change Requests:* **CR0018**r4 [[S4aR250124](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_RTC/Docs/S4aR250124.zip)] “Enabling RTC support of dynamic traffic characteristics”.
* **CR0019**r4 [[S4aR250122](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_RTC/Docs/S4aR250122.zip)] “Enhancements to dynamic policy resource for SDES RTP HE” concerning multiplexed media flows.
* **CR0023**r1 [[S4-251079](https://www.3gpp.org/ftp/tsg_sa/WG4_CODEC/TSGS4_132_Fukuoka/Docs/S4-251079.zip)] “Addition of N6-unmarked PDUs to Dynamic Policy instantiation”.

CR0034r1 [S4-241517]:* Added text at clause 5.3.3.2 specifying the population of the Policy Template Binding in Service Access Information.

CR0034r2:* Provided multiplexed media identification details for uplink and downlink media flows separately as agreed in CT3#142 meeting.
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# Code changes for dynamically changing traffic characteristics

The code changes associated with this Change Request are available for review at the following URL on 3GPP Forge:

<https://forge.3gpp.org/rep/sa4/amd-pro-med/-/merge_requests/7>

<https://forge.3gpp.org/rep/sa4/amd-pro-med/-/merge_requests/7/diffs?commit_id=8117dcbde7aea96303908080445ff71c5906ce7b>

The proposed changes are reproduced below for posterity.

## TS26510\_CommonData.yaml

---a/TS26510\_CommonData.yaml
+++b/TS26510\_CommonData.yaml

@@ -1,7 +1,7 @@

1 1 openapi: 3.0.0

2 2 info:

3 3 title: 'Media Delivery: Common Data Types'

4 - version: 1.0.2

 4 + version: 1.0.3

5 5 description: |

6 6 Media Delivery: Common Data Types

7 7 © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).

@@ -12,7 +12,7 @@ tags:

12 12 description: 'Media Delivery: Common Data Types'

13 13

14 14 externalDocs:

15 - description: 'TS 26.510 V18.4.0; Media Delivery; Interactions and APIs for media session handling'

 15 + description: 'TS 26.510 V19.0.0; Media Delivery; Interactions and APIs for media session handling'

16 16 url: 'https://www.3gpp.org/ftp/Specs/archive/26\_series/26.510/'

17 17

18 18 paths: {}

@@ -151,6 +151,15 @@ components:

151 151 pduSetMarking:

152 152 type: boolean

153 153 default: false

 154 + downlinkDataBurstSizeMarkingRequired:

 155 + type: boolean

 156 + default: false

 157 + downlinkTimeToNextBurstMarkingRequired:

 158 + type: boolean

 159 + default: false

 160 + downlinkExpeditedTransferIndicationMarkingRequired:

 161 + type: boolean

 162 + default: false

154 163

155 164 UnidirectionalBitRateSpecification:

156 165 type: object

@@ -184,6 +193,9 @@ components:

184 193 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSetQosPara'

185 194 desiredUplinkPduSetQosParameters:

186 195 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSetQosPara'

 196 + downlinkExpeditedTransferIndication:

 197 + type: boolean

 198 + default: false

187 199

188 200 ChargingSpecification:

189 201 type: object

## TS26510\_Maf\_SessionHandling\_ServiceAccessInformation.yaml

---a/TS26510\_Maf\_SessionHandling\_ServiceAccessInformation.yaml
+++b/TS26510\_Maf\_SessionHandling\_ServiceAccessInformation.yaml

@@ -1,7 +1,7 @@

1 1 openapi: 3.0.0

2 2 info:

3 3 title: Maf\_SessionHandling\_ServiceAccessInformation

4 - version: 1.0.2

 4 + version: 1.0.3

5 5 description: |

6 6 Media Delivery: Service Access Information API

7 7 © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).

@@ -12,7 +12,7 @@ tags:

12 12 description: 'Media Delivery: Service Access Information API'

13 13

14 14 externalDocs:

15 - description: 'TS 26.510 V18.4.0; Media Delivery; Interactions and APIs for media session handling'

 15 + description: 'TS 26.510 V19.0.0; Media Delivery; Interactions and APIs for media session handling'

16 16 url: 'https://www.3gpp.org/ftp/Specs/archive/26\_series/26.510/'

17 17

18 18 servers:

@@ -199,6 +199,15 @@ components:

199 199 pduSetMarking:

200 200 type: boolean

201 201 default: false

 202 + downlinkDataBurstSizeMarkingRequired:

 203 + type: boolean

 204 + default: false

 205 + downlinkTimeToNextBurstMarkingRequired:

 206 + type: boolean

 207 + default: false

 208 + downlinkExpeditedTransferIndicationMarkingRequired:

 209 + type: boolean

 210 + default: false

202 211 bdtWindows:

203 212 type: array

204 213 minItems: 1

# Code changes for multiplexed media flows

The code changes associated with this Change Request are available for review at the following URL on 3GPP Forge:

https://forge.3gpp.org/rep/sa4/amd-pro-med/-/merge\_requests/TBA

https://forge.3gpp.org/rep/sa4/amd-pro-med/-/merge\_requests/TBA

The proposed changes are reproduced below for posterity.

Change

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

5GC 5G Core

AF Application Function

ANBR Access Network Bit rate Recommendation

API Application Programming Interface

AS Application Server

BDT Background Data Transfer

CHEM Coverage and Handoff Enhancements using Multimedia error robustness

DN Data Network

DS Differentiated Services

DSCP DS Code Point

EAS Edge Application Server

EEC Edge Enabler Client

EES Edge Enabler Server

FQDN Fully Qualified Domain Name

GPSI Generic Public Subscription Identifier

ICE Interactive Connectivity Establishment

JSON JavaScript Object Notation

MFBR Maximum Flow Bit Rate

NEF Network Exposure Function

OAM Operations, Administration and Maintenance

PCC Policy Control and Charging

PCF Policy Control Function

PDR Packet Detection Rule

PHB Per-Hop Behaviour

PSI PDU Set Importance

QoE Quality of Experience

QoS Quality of Service

QFI QoS Flow Identifier

RTC Real-Time (media) Communication

STUN Session Traversal Utilities for NAT, Simple Traversal of User Datagram Protocol (UDP) through Network Address Translators

SWAP Simple WebRTC Application Protocol

TCP Transmission Control Protocol

TOS Type of Service

TURN Traversal Using Relays around NAT

UE User Equipment

URI Uniform Resource Identifier

URL Uniform Resource Locator

dynamic policy Provisioning

#### 5.2.7.1 General

These operations are used by the Media Application Provider to configure Policy Templates for the media delivery sessions of a particular Provisioning Session.

A Policy Template, identified by its policyTemplateId, represents a set of PCF/NEF API parameters which defines the service quality and/or associated charging for the corresponding media delivery session(s). The Policy Template is configured as part of the provisioning procedures with the Media AF using the API specified in clause 8.7 and is subsequently instantiated by a Media Session Handler or Media AS (whichever is acting as Dynamic Policy invoker) using the interactions specified in clause 5.3.3.

When a Policy Template requires media to be delivered in a specific Data Network and/or network slice at reference point M4, the applicationSessionContext array shall be present with at least one of the following properties populated:

- The dnn property contains the name of the Data Network in which the Media AS is hosted.

- When Network Slicing is used, the sliceInfo property contains information about the network slice which is serving the UE.

When a Policy Template is intended to influence the network QoS of Service Data Flows used for media delivery, the qoSSpecifications array shall be populated with objects of type Policy‌Constraints (see clause 7.3.3.4). Each member of the array describes the QoS limits of an application service component that a Media Client is permitted request when instantiating the Policy Template:

- The componentReference property is a string used by the Dynamic Policy invoker to reference this PolicyConstraints when instantiating the Policy Template. It shall be unique for all members of the same qoSSpecifications array.

- The qosReference value, as specified in clause 5.6.2.7 of TS 29.514 [18], is obtained with the Service Level Agreement. See TS 23.502 [3] for detailed usage.

- The maximumBitRate properties of the downlinkQosSpecification and uplinkQosSpecification objects define the maximal bit rates which are permitted to be requested by a Dynamic Policy invoker on (respectively) downlink and uplink Service Data Flows. These values are defined by configuration of the 5G System and are therefore populated by the Media AF rather than by the Media Application Provider.

- The maximumAuthorisedBitRate properties of the downlinkQosSpecification and uplinkQosSpecification objects define the maximal bit rates which a Dynamic Policy invoker is authorised to request on (respectively) downlink and uplink Service Data Flows. Higher bit rates are not authorised by the Media Application Provider when the Policy Template is instantiated.

- The minimumPacketLossRate properties of the downlinkQosSpecification and uplinkQosSpecification objects define the minimal packet loss rates which are permitted to be requested by a Dynamic Policy invoker on (respectively) downlink and uplink Service Data Flows. Lower packet loss rates are not permitted by the Media Application Provider when the Policy Template is instantiated.

- The pduSetQosLimits properties of the downlinkQosSpecification and uplinkQosSpecification objects define the minimal delay budget and minimal error rates for PDU Sets which are permitted to be requested by a Dynamic Policy invoker on (respectively) downlink and uplink Service Data Flows. Lower delay and error rates are not permitted by the Media Application Provider when the Policy Template is instantiated.

- The pduSetMarking flag is used to specify whether Media Clients instantiating this Policy Template for uplink media delivery, or Media AS instances for downlink media delivery, are required to apply PDU Set marking to media transport protocol PDUs falling within the scope of a Dynamic Policy Instance based on this Policy Template.

NOTE 1: PDU Set marking is used by the 5G System to satisfy the QoS requirements of application flows.

- The downlinkDataBurstSizeMarkingRequired flag is used to specify whether the Media AS is required to apply data burst size marking to downlink PDUs falling within the scope of a Dynamic Policy Instance based on this Policy Template.

- The downlinkTimeToNextBurstMarkingRequired flag is used to specify whether the Media AS is required to apply time to next burst marking to downlink PDUs falling within the scope of a Dynamic Policy Instance based on this Policy Template.

- The downlinkExpeditedTransferIndicationMarkingRequiredflag is used to specify whether the Dynamic Policy invoker (Media Client or the Media AS) is allowed to configure different QoS requirements for expedited and non-expedited PDU delivery, and whether the Media AS is required to apply expedited transfer indication marking to downlink PDUs falling within the scope of a Dynamic Policy Instance based on this Policy Template.

When a Policy Template is intended to be used for differential charging, the chargingSpecification property shall be present.

When a Policy Template is intended to be used for Background Data Transfer, the properties of a new Background Data Transfer policy are specified by the Media Application Provider in the bdtSpecification property (of type Bdt‌Policy‌Schedule).

- The startDate and endDate indicate the time period for which the Background Data Transfer specification is valid. A Background Data Transfer specification may be removed from its parent Policy Template by the Media AF when it expires.

- The windows property indicates the time windows over which the Background Data Transfer may occur.

- Each such time window is characterised by a start time (startTime), a duration (duration) and the days of the week on which the time window is scheduled (daysOfWeek).

- The numberOfUes property indicates the maximum number of UEs permitted to instantiate the Policy Template and make use of Background Data Transfers during a single time window instance.

- The estimatedDataVolumePerUe that reflects the average data volume that each UE is expected to transfer during a single time window instance.

NOTE 2: The product of the numberOfUes and estimatedDataVolumePerUe properties represents an estimate of the maximum data volume that may be transferred during any given time window instance.

- The aggregate‌Uplink‌BitRate‌Limit and aggregate‌DownlinkBitRate‌Limit properties specify limits on the total aggregate bit rate of all currently instantiated Policy Templates to be enforced by the Media AF's admission control function. If omitted, the Media AF may instantiate a Policy Template with a Background Data Transfer specification regardless of additional costs that may be incurred by the Media Application Provider as a result.

HTTP responses for successful and operation-specific failure cases are specified in the following clauses. For all other failure cases, an HTTP response indicating a response code in accordance with clause 7.1.6 shall be returned to the API client. In all failure cases a message body in accordance with clause 7.1.7 shall be included in the response message.

Service Access Information acquisition

5.3.2.1 General

Service Access Information is the set of parameters and addresses needed by the Media Client to activate reception of a downlink media delivery session, to activate an uplink media delivery session for content contribution or to obtain configuration parameters to initiate real-time media communication (RTC).

The Media Session Handler may obtain Service Access Information in one of two ways:

1. From the Media-aware Application via reference point M6. In this case, the Service Access Information is initially acquired by the Media-aware Application from the Media Application Provider via reference point M8 and the Media-aware Application shall pass the parameters to the Media Session Handler using one of the session launch mechanisms specified in clauses 11.2.2.1 and 6.

2. From the Media AF via reference point M5. In this case, the Service Access Information is derived by the Media AF from a Provisioning Session established at reference point M1 and the Media AF exposes this to the Media Session Handler using the operations specified in this clause. At the start of a media delivery session, a minimal set of baseline Service Access Information parameters is passed to the Media Session Handling using one of the session launch mechanisms specified in clauses 11.2.2.1 and 6 and this causes it to fetch the full Service Access Information from the Media AF using the procedure specified in clause 5.3.2.3.

The data model of the Service Access Information resource acquired by the Media Session Handler of the Media Client is specified in clause 9.2.3. The Service Access Information typically includes:

- For downlink media streaming according to TS 26.512 [6], a set of Media Entry Points that can be consumed by the Media Access Function. One of these is selected by the Media Session Handler or by the Media-aware Application and is handed to the Media Access Function via reference point M11 or M7 respectively.

- For uplink media according to TS 26.512 [6], a description of an entry point for the publishing of the uplink streaming content.

- For RTC according to TS 26.113 [7] specifies a configuration for the Media Client to assist in establishing interactive connectivity with other RTC session participants.

Service Access Information additionally includes configuration information to allow the Media Session Handler to invoke procedures for dynamic policy (see clause 5.3.3), network assistance (clause 5.3.4), QoE metrics reporting (clause 5.3.5) and consumption reporting (clause 5.3.6).

To support dynamic policy instantiation, Service Access Information shall include a Policy Template Binding for each Policy Template provisioned in the applicable Provisioning Session (see clause 5.2.7.1) populated as follows:

- The externalReference property shall be populated from the externalReference property of the corresponding Policy Template.

- The policyTemplateId property shall be populated from the policyTemplateId property of the corresponding Policy Template.

- The pduSetMarking property shall be present and set true if any member of the qoSSpecifictions array of the corresponding Policy Template has a pduSetMarking property set true.

- The downlink‌Data‌Burst‌Size‌Marking‌Required flag shall be present and set true if any member of the qoSSpecifictions array of the corresponding Policy Template has a downlink‌Data‌Burst‌Size‌Marking‌Required property set true.

- The downlink‌Time‌To‌Next‌Burst‌Marking‌Required flag shall be present and set true if any member of the qoSSpecifictions array of the corresponding Policy Template has a downlink‌Time‌To‌Next‌Burst‌Marking‌Required property set true.

- The downlink‌Expedited‌Transfer‌Indication‌Marking‌Required flag shall be present and set true if any member of the qoSSpecifictions array of the corresponding Policy Template has a downlink‌Expedited‌Transfer‌Indication‌Marking‌Required property set true

- The bdtWindows property shall be populated with a forward schedule of Background Data Transfer windows based on the bdtSpecification property of the corresponding Policy Template (if provisioned) and/or based on interactions between the Media AF and the PCF/NEF as specified in clause 5.5.3.

If an Edge Resources Configuration with client-driven management (*EM\_CLIENT\_DRIVEN*) is provisioned in the applicable Provisioning Session (see clause 5.2.6), the Media AF shall convey a Client Edge Resources Configuration to the Media Session Handler as part of the Service Access Information it provides at reference point M5.

HTTP responses for successful and operation-specific failure cases are specified in the following clauses. For all other failure cases, an HTTP response indicating a response code in accordance with clause 7.1.6 shall be returned to the API client. In all failure cases a message body in accordance with clause 7.1.7 shall be included in the response message.

dynamic policy invocation

#### 5.3.3.2 Create Dynamic Policy Instance resource operation

In order to instantiate a new dynamic policy, the Media Session Handler or Media AS (whichever is acting as Dynamic Policy invoker) shall first create a resource for the Dynamic Policy Instance in the Media AF. The Dynamic Policy invoker shall use the HTTP POST message for this purpose. The body of the HTTP POST message shall be a Dynamic Policy Instance resource representation that includes a Provisioning Session identifier, the resource identifier of the target Policy Template and a set of Service Data Flow descriptions identifying the application flow(s) to be policed.

1. The provisioningSessionId property associates the Dynamic Policy Instance resource with a Provisioning Session.

2. The policyTemplateId property uniquely identifies the Policy Template on which the Dynamic Policy Instance is based.

3. For each application flow to be managed by the Dynamic Policy Instance resource, an instance of the Application‌Flow‌Binding object shall be present in the appplication‌Flow‌Bindings array. The applicationFlow‌Description property of this object shall be populated by the Dynamic Policy invoker and shall declare a Service Data Flow template according to TS 23.503 [17] that describes application flow in question. Exactly one of the following filtering specifications shall be populated in the Application‌FlowDescription object to identify traffic belonging to a media delivery application flow:

- a packetFilter object (including 5-tuples, Type of Service, Security Parameter Index, etc.). A Media Client shall not attempt to instantiate more than one Dynamic Policy Instance at the same time that cites the same set of packet filters*.*

- a domainName populated with the fully-qualified Internet domain name of a Media AS at reference point M4*.* A Media Client shall not attempt to instantiate more than one Dynamic Policy Instance at the same time that cites the same domainName*.*

 In addition, the top-level media type of the application flow may be declared in the mediaType property.

 When the policy binding for the chosen Policy Template indicates that PDU Set marking is enabled (i.e., the pduSetMarking flag is set to true in Service Access Information), the Dynamic Policy invoker shall also populate the mediaTransportParameters property with the media transport protocol parameters to be used by the Media Access Function on the application flow in question to label uplink PDUs belonging to the same PDU Set and/or to indicate the last PDU in each PDU Set and/or to indicate the end of a data burst comprising one or more PDU Sets.

 When the policy binding for the chosen Policy Template indicates that PDU Set marking is not enabled (i.e., the pduSetMarking flag is set to false in Service Access Information) but specific QoS handling based on PDU Sets is nevertheless desired, the Dynamic Policy invoker shall also populate the mediaTransportParameters property with the media transport protocol parameters to be used by the Media Access Function on the application flow in question to indicate the RTP payload information for uplink PDUs which can be used to derive the PDU Set information.

NOTE: RTP payload information includes the RTP payload type and RTP payload format. The corresponding data type RtpPayloadInfo is specified in clause 5.5.4.15 of TS 29.571 [33].

 When the policy binding for the chosen Policy Template indicates that PDU Set marking is enabled (i.e., the pduSetMarking flag is set to true in Service Access Information), the Dynamic Policy invoker shall also populate the mediaTransportParameters property with the media transport protocol parameters to be used by the Media AS on the application flow in question to label downlink PDUs belonging to the same PDU Set and/or to indicate the last PDU in each PDU Set and/or to indicate the end of a data burst comprising one or more PDU Sets as well as to indicate the desired PDU Set Importance (PSI) values for N6-unmarked downlink PDUs on the application flow in question.

 When the policy binding for the chosen Policy Template indicates that PDU Set marking is not required (i.e., the pduSetMarking flag is set to false in Service Access Information) but specific QoS handling based on PDU Sets is nevertheless desired, the Dynamic Policy invoker shall also populate the mediaTransportParameters property with the media transport protocol parameters to be used by the Media AS on the application flow in question to indicate the RTP payload information for downlink PDUs which can be used to derive the PDU Set information, as well as to indicate the desired PDU Set Importance (PSI) values for N6-unmarked downlink PDUs on the application flow in question.

 When the policy binding for the chosen Policy Template indicates that data burst size marking is enabled (i.e., downlinkDataBurstSizeMarkingRequired is set to *true* in Service Access Information), the Dynamic Policy invoker shall also populate the mediaTransportParameters property with the media transport protocol parameters to be used by the Media AS on the application flow in question to label downlink PDUs belonging to the same data burst with the size of that data burst.

 When the policy binding for the chosen Policy Template indicates that time to next burst marking is enabled (i.e., downlinkTimeToNextBurstMarkingRequired is set to *true* in Service Access Information), the Dynamic Policy invoker shall also populate the mediaTransportParameters property with the media transport protocol parameters to be used by the Media AS on the application flow in question to label downlink PDUs belonging to the same data burst with the predicted time to the next burst.

 When the policy binding for the chosen Policy Template indicates that expedited transfer indication marking is enabled (i.e., downlinkExpeditedTransferIndicationMarkingRequired is set to *true* in Service Access Information), the Dynamic Policy invoker shall also populate the mediaTransportParameters property with the media transport protocol parameters to be used by the Media AS on the application flow in question to label downlink PDUs with the expedited transfer indication.

 When the policy binding for the chosen Policy Template indicates that expedited transfer indication marking is enabled (i.e., downlinkExpeditedTransferIndicationMarkingRequired is set to *true* in Service Access Information), the Dynamic Policy invoker shall also populate two Application‌Flow‌Binding objects in the application‌Flow‌Bindings array, one with the downlinkExpeditedTransferIndication set to true and the other with this property set to false. The remainder of application‌Flow‌Description properties of the two Application‌Flow‌Binding objects shall be populated identically and shall declare the same Service Data Flow template describing the same application flow for which expedited transfer indication marking is sometimes desired.

 When multiple media streams are multiplexed into a single application flow, the Dynamic Policy invoker may also populate the uplink‌multiplexed‌Media‌Infos and downlink‌Multiplexed‌Media‌Infos properties (as applicable) with the *media identification information* parameters to be used by the 5G System for traffic detection and differentiated QoS on the uplink and downlink respectively. The population of objects in these arrays is not further specified in the present document.

- For uplink-only application flows, including those terminating on a Media AS, the downlink‌Multiplexed‌Media‌Infos property shall be omitted.

- For downlink-only application flows, including those originating from a Media AS, the uplink‌Multiplexed‌Media‌Infos property shall be omitted.

- For application flows carrying multiplexed media flows between two Media Clients (i.e., uplink followed by downlink via the UPF at reference point M12 or via Media AS at reference point M4), both the uplink‌Multiplexed‌Media‌Infos and downlink‌Multiplexed‌Media‌Infos properties shall be present. The population of these two arrays may be further constrained by the media delivery system.

4. When the Dynamic Policy invoker attempts to activate a QoS-related Policy Template, the qosSpecification property shall also be present in the Application‌Flow‌Binding object containing the following properties specified in clause 7.3.3.6 to describe the QoS requirements of the media application flows described by the bound applicationFlowDescription property:

- downlinkBitRates shall indicate the maximum requested bit rate, minimum desired bit rate and minimum requested bit rate in the downlink direction.

- uplinkBitRates shall indicate the maximum requested bit rate, minimum desired bit rate and minimum requested bit rate in the uplink direction.

- desiredPacketLatency may indicate the desired packet latency in both the downlink and uplink directions.

- desiredPacketLossRate may indicate the desired packet loss rate in both the downlink and uplink directions.

- desiredDownlinkPduSetQosParameters may be populated to indicate the desired delay budget and error rate for PDU Sets in the downlink direction, as well as indicating whether the loss of a single PDU in a PDU Set is significant for the receiving application.

- desiredUplinkPduSetQosParameters may be populated to indicate the desired delay budget and error rate for PDU Sets in the uplink direction, as well as indicating whether the loss of a single PDU in a PDU Set is significant for the receiving application.

- downlinkExpeditedTransferIndication may be populated and shall be set to true for QoS requirements that apply to application flows requiring expedited transfer in both uplink and downlink directions from the network. When downlinkExpeditedTransferIndication is set to true, the downlinkBitRates and uplinkBitRates properties shall be populated identically. If downlinkExpeditedTransferIndication is omitted or set to false, the QoS requirements apply to non-expedited transfer.

5. When the Dynamic Policy invoker instantiates a Policy Template that is provisioned with a Background Data Transfer (BDT) specification per clause 5.2.7.1, the bdtSpecification property shall be present and it shall contain the following properties:

- estimatedDataTransferVolume, indicating the data volume that the Media Client estimates it will use during the current Background Data Transfer time window.

- Each object (see clause 7.3.3.14) conveyed in the windows array indicates a time window over which Background Data Transfers are requested by the Dynamic Policy invoker from those offered in the dynamic policy configuration of the Service Access Information resource (see clause 5.3.2.1).

- Each such window may additionally indicate the maximum bit rate for Background Data Transfers in the downlink and uplink directions that the Dynamic Policy invoker is bidding for in (respectively) the maximimumDownlinkBitRate and maximimumUplinkBitRate properties. In response, the Media AF populates these properties with the maximum permitted bit rate for Background Data Transfers in the downlink and uplink directions respectively when the dynamic policy is in force.

6. When the 5G System employs a traffic enforcement function to ensure that traffic complies with the policy described by the qosSpecification property, the Media AF shall explicitly indicate this in the Dynamic Policy resource representation by setting the qosEnforcement property to true.

If the operation is successful, the Media AF shall create a new Dynamic Policy Instance resource. In this case, the Media AF shall return a 201 (Created) HTTP response message to the Dynamic Policy invoker, and the URL of the newly created Dynamic Policy Instance resource, including its resource identifier, shall be provided as the value of the Location HTTP header field. The response message body shall be a representation of the current state of the Dynamic Policy Instance resource (see clause 9.3.3.1), including any properties assigned by the Media AF.

Upon successful creation of the Dynamic Policy Instance resource, notifications of updates to the resource may be notified asynchronously to the Dynamic Policy invoker:

- If the notificationURL property is present in the Service Access Information, the Dynamic Policy invoker shall subscribe to the MQTT sub-topic corresponding to the resourceId of the Dynamic Policy Instance and shall expect to receive asynchronous notifications published by the Media AF on the MQTT notification channel of type NOTIFICATION\_‌DYNAMIC\_‌POLICY\_‌INSTANCE concerning changes to the Dynamic Policy Instance, including details about new Background Data Transfer opportunities.

- The Media AF shall use the MQTT notification channel signalled in the Service Access Information (if any, see clause 5.3.2.3) to notify the Dynamic Policy invoker subscriber about updates to the Dynamic Policy Instance resource. A notification message of type NOTIFICATION\_‌DYNAMIC\_‌POLICY\_‌INSTANCE shall be published to the MQTT sub-topic corresponding to the resourceId of the Dynamic Policy Instance.

The usage and message formats for the MQTT notification channel are specified in clause 10.2.

When the Dynamic Policy Instance is successfully instantiated, the Media AF triggers the creation of a corresponding PCC rule in the 5G System according to clause 5.5.3 to enforce the required QoS and/or charging policy on the specified application flow(s). Depending on the ApplicationFlowDescription objects in the received Dynamic Policy Instance resource representation and the filterMethod indicated by each one, the Media AF shall populate for each one a flowDescription object and/or provide an Application Identifier referring to a PFD (Packet Flow Description) object containing the domain name of a Media AS instance.

NOTE: When the Media AF is deployed in an external Data Network, it is the responsibility of the NEF to map any external Application Identifier supplied by the Media AF into an internal Application Identifier that is known to the PCF.

If the supplied Dynamic Policy Instance is not acceptable to the Media AF, the create operation shall fail with an HTTP response status code of 400 (Bad Request) and an error message body per clause 7.1.7. In this case, the Dynamic Policy Instance resource shall remain in an uncreated state in the Media AF.

If the request is acceptable but the Media AF forbids the instantiation of the referenced Policy Template, for example because the quota for Background Data Transfers has been exceeded or because the UE is not permitted in the charging specification, the create operation shall fail with an HTTP response status code of 403 (Forbidden) and an error message body per clause 7.1.7. In this case, the Dynamic Policy Instance resource shall remain in an uncreated state in the Media AF.

If the request is acceptable but the Media AF is unable to provision the resources required by the supplied Dynamic Policy Instance, the create operation shall fail with an HTTP response status code of 500 (Internal Server Error) and an error message body per clause 7.1.7. In this case, the Dynamic Policy Instance resource shall remain in an uncreated state in the Media AF.

If the Dynamic Policy invoker needs to instantiate several dynamic policies, it may invoke this operation as often as needed.

5GC policy control (N5/N33) interactions

##### 5.5.3.3.3 Mapping of dynamic traffic characteristics parameters

NOTE: Handling of dynamically changing traffic characteristics by the 5G Core at reference point M12 is for future study.

When the Media AF directly invokes the Npcf\_PolicyAuthorization service at reference point N5 according to TS 29.514 [18], the *Media*‌*Component* object in the PCF at reference point N5 associated with the *Application*‌*Flow*‌*Binding* shall be populated as follows by the Media AF to enable downlink dynamic traffic characteristics detection by the 5G Core based on PDU markings present in the media transport at reference point M4 only:

* If the downlinkDataBurstSizeMarkingRequired property is present and true in the qosSpecification property of the Policy TemplateqosSpecifications, then the Media‌Component.‌dat‌Burst‌Size‌Ind property shall be populated by the Media AF at reference point N5 with the same value.
* If the downlinkTimeToNextBurstMarkingRequired property is present and true in the qosSpecification property of the Policy Template qosSpecifications, then the Media‌Component.‌time‌to‌Next‌Burst‌Ind property shall be populated by the Media AF at reference point N5 with the same value.
* If the downlinkExpeditedTransferIndicationRequired property is present and true in the qosSpecification property of the Policy Template qosSpecifications, and the downlink‌Expedited‌Transfer‌Indication is present in an ApplicationFlowBinding.‌qosSpecification object of a DynamicPolicy resource instantiating the Policy Template, then for a correspondingMediaComponent at reference point N5, the Media‌Component.‌exp‌Tran‌Ind property shall be populated by the Media AF at reference point N5 with the same value as the downlink‌Expedited‌Transfer‌Indication.

When the Media AF invokes the Nnef\_AFsessionWithQoS service at reference point N33 according to TS 29.522 [19] and TS 29.122 [20], the AsSessionWithQoSSubscription resource at reference point N33 shall be populated as follows by the Media AF to enable downlink dynamic traffic characteristics detection by the 5G Core based on PDU markings present in the media transport at reference point M4 only:

* If the downlinkDataBurstSizeMarkingRequired property is present and true in the qosSpecification property of the Policy Template qosSpecifications, then the AsSessionWithQoSSubscription.‌dat‌Burst‌Size‌Ind property shall be populated by the Media AF at reference point N33 with the same value.
* If the downlinkTimeToNextBurstMarkingRequired property is present and true in the qosSpecification property of the Policy Template qosSpecifications, then the AsSessionWithQoSSubscription.‌time‌to‌Next‌Burst‌Ind property shall be populated by the Media AF at reference point N33 with the same value.
* If the downlinkExpeditedTransferIndicationRequired is present and true in the qosSpecification property of the Policy Template qosSpecifications, and the downlink‌Expedited‌Transfer‌Indication is present in anApplicationFlowBinding.‌qosSpecification object of a DynamicPolicy resource instantiating the Policy Template, then for a corresponding AsSessionWithQoSSubscription at reference point N33, the AsSession‌With‌QoS‌Subscription.exp‌Tran‌Ind property shall be populated by the Media AF at reference point N33 with the same value as thedownlink‌Expedited‌Transfer‌Indication.

##### 5.5.3.3.4 Mapping of multiplexed media flow information

When the Media AF directly invokes the Npcf\_PolicyAuthorization service at reference point N5 according to TS 29.514 [18], the *Media*‌*Component* object in the PCF at reference point N5 associated with the *Application*‌*Flow*‌*Binding* shall be populated as follows by the Media AF to enable multiplexed media traffic identification by the 5G Core based on media identification information present in the media transport at reference point M4 or M12:

- When Application‌Flow‌Description.‌uplink‌Multiplexed‌Media‌Infos and/or Application‌Flow‌Description.‌downlink‌Multiplexed‌Media‌Infos properties are present for an application data flow, the Media‌Component.‌medSubComps array shall include a MediaSubComponent object describing each media stream of the application data flow at reference point N5. The MediaSubComponent of a media flow shall be populated as follows:

- The marBwDl and marBwUl properties shall be set to the maximum requested bit rate for this media flow in the downlink and uplink directions respectively.

- The mpxMediaUlInfos array shall be populated with a copy of the corresponding MpxMediaInfo objects provided in Application‌Flow‌Description.‌uplink‌Multiplexed‌Media‌Infos.

- The mpxMediaDlInfos array shall be populated with a copy of the corresponding MpxMediaInfo objects provided in Application‌Flow‌Description.‌downlink‌Multiplexed‌Media‌Infos.

When the Media AF invokes the Nnef\_AFsessionWithQoS service at reference point N33 according to TS 29.522 [19] and TS 29.122 [20], the multiModDatFlows property ofAsSessionWithQoSSubscription resource at reference point N33 shall be populated as follows by the Media AF to enable multiplexed media traffic identification by the 5G Core based on media identification information present in the media transport at reference point M4 or M12:

- When Application‌Flow‌Description.‌uplink‌multiplexed‌Media‌Infos and/or Application‌Flow‌Description.‌downlink‌multiplexed‌Media‌Infos properties are present for an application data flow, a separate AsSessionMediaComponent object shall be used to describe each media stream of the application data flow at reference point N33 and this object shall be populated as follows:

- The marBwDl and marBwUl properties shall be set to the maximum requested bit rate for the media flow in the downlink and uplink directions respectively.

- The flowInfos array shall include a single FlowInfo object describing the media flow that shall be populated as follows:

- The mpxMediaUlInfos array shall be populated with a copy of the corresponding MpxMediaInfo objects provided in Application‌Flow‌Description.‌uplink‌multiplexed‌Media‌Infos.

- The mpxMediaDlInfos array shall be populated with a copy of the corresponding MpxMediaInfo objects provided in Application‌Flow‌Description.‌downlink‌multiplexed‌Media‌Infos.

Application Flow Description

#### 7.3.3.2 ApplicationFlowDescription type

This data type is used to declare the properties of an application data flow to the Media AF during the course of a media delivery session. Its properties are used to describe a Service Data Flow to the 5G Core for the purpose of application traffic detection.

Table 7.3.3.2-1: Definition of type ApplicationFlowDescription

|  |  |  |  |
| --- | --- | --- | --- |
| Property name | Data type | Cardinality | Description |
| filterMethod | SdfMethod | 1..1 | The filtering method used to identify packets belonging to this application flow (see clause 7.3.4.2). |
| packetFilter | IpPacketFilterSet | 0..1 | Description of the application flow in terms of packet header field values (see below). |
| domainName | string | 0..1 | Description of the application flow in terms of the Fully-Qualified Domain Name (FQDN) of the Media AS targeted at reference point M4 (see below). |
| mediaType | MediaType | 0..1 | The type of media carried by this application flow (see NOTE 1). |
| mediaTransport‌Parameters | Protocol‌Description | 0..1 | The set of media transport protocol parameters to be used by the 5G Core for the purpose of PDU Set identification and/or end of data burst detection on this application flow (see NOTE 2). |
| uplinkMultiplexed‌Media‌Infos | array(Mpx‌Media‌Info) | 0..N | The list of uplink media identification information parameters to be used by the 5G Core for the purpose of multiplexed media identification on this application flow (see NOTE 3) |
| downlinkMultiplexed‌MediaInfos | array(Mpx‌Media‌Info) | 0..N | The list of downlink media identification information parameters to be used by the 5G Core for the purpose of multiplexed media identification on this application flow (see NOTE 3) |
| NOTE 1: Enumeration MediaType is specified in clause 5.6.3.3 of TS 29.514 [18].NOTE 2: Data type ProtocolDescription is specified in clause 5.5.4.13 of TS 29.571 [33].NOTE 3: Data type *M*pxMediaInfo is specified in clause 5.6.2.61 of TS 29.514 [18]. |

Exactly one of the following properties shall be populated: packetFilter, domainName.

M1 Policy Constraints

#### 7.3.3.4 PolicyConstraints type

This data type is used to specify permitted ranges of QoS parameters and/or to mandate the use of certain QoS features of the 5G System.

Table 7.3.3.4-1: Definition of type PolicyConstraints

|  |  |  |  |
| --- | --- | --- | --- |
| Property name | Data type | Cardinality | Description |
| component‌Reference | string | 1..1 | A unique string identifying this QoS specification within the scope of its parent. |
| qosReference | string | 0..1 | As specified in clause 5.6.2.7 of TS 29.514 [18]. |
| downlink‌Qos‌Specification | Unidirectional‌Qos‌Specification | 0..1 | QoS specification in the downlink direction (see below and clause 7.3.3.3). |
| uplink‌Qos‌Specification | Unidirectional‌Qos‌Specification | 0..1 | QoS specification in the uplink direction (see below and clause 7.3.3.3). |
| pdu‌Set‌Marking | boolean | 0..1 | Indicates that packets at reference point M4 are required to include PDU Set marking if the media transport protocol supports this.Default value false if omitted. |
| downlink‌Data‌Burst‌Size‌Marking‌Required | boolean | 0..1 | Indicates that downlink packets at reference point M4 are required to include data burst size marking if the media transport protocol supports this.Default value *false* if omitted. |
| downlink‌Time‌To‌Next‌Burst‌Marking‌Required | boolean | 0..1 | Indicates that downlink packets at reference point M4 are required to include time to next burst marking if the media transport protocol supports this.Default value *false* if omitted. |
| downlink‌Expedited‌Transfer‌Indication‌Marking‌Required | boolean | 0..1 | Indicates that downlink packets at reference point M4 are required to include expedited transfer indication marking if the media transport protocol supports this.Default value *false* if omitted. |

At least one of the following properties shall be populated: qosReference, downlink‌Qos‌Specification, uplink‌Qos‌Specification.

M5 Client Policy Specification

#### 7.3.3.6 ClientPolicySpecification type

Table 7.3.3.6-1: Definition of type ClientPolicySpecification

|  |  |  |  |
| --- | --- | --- | --- |
| Property name | Data type | Cardinality | Description |
| downlinkBitRates | Unidirectional‌Bit‌Rate‌Specification | 1..1 | Bit rate specification for the downlink direction (see clause 7.3.3.5). |
| uplinkBitRates | Unidirectional‌Bit‌Rate‌Specification | 1..1 | Bit rate specification for the uplink direction (see clause 7.3.3.5). |
| desiredPacketLatency | number | 0..1 | Desired packet latency in milliseconds, expressed as a positive floating-point value (see NOTE 1). |
| desiredPacketLossRate | Packet‌Loss‌Rate | 0..1 | Desired packet loss rate expressed in tenths of a percent (see NOTE 1). |
| desiredDownlinkPduSetQosParameters | PDUSet‌Qos‌Para | 0..1 | Desired PDU Set QoS parameters for the downlink direction (see NOTE 2). |
| desiredUplinkPduSetQosParameters | PDUSet‌Qos‌Para | 0..1 | Desired PDU Set QoS parameters for the uplink direction (see NOTE 2). |
| downlink‌Expedited‌Transfer‌Indication | boolean | 0..1 | If set to true indicates this object applies to an application data flow whose transport is to be expedited by the network. In this case*,* downlink‌Bit‌Rates and uplink‌Bit‌Rates shall be set to the same values.If set to false indicates this object applies to an application data flow whose transport is not to be expedited by the network.Default value is false if omitted. |
| NOTE 1: Clause 5.6.2.7 of TS 29.514 [18] restricts packet latency and packet loss to be the same in the downlink and uplink directions for a given MediaComponent when the CHEM feature is not supported by the PCF.NOTE 2: Data type PDUSetQosPara is specified in clause 5.5.4.11 of TS 29.571 [33]. |

Service Access Information API

#### 9.2.3.1 ServiceAccessInformation resource type

The data model for the ServiceAccessInformation resource is specified in table 9.2.3.1-1 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 9.2.3.1‑1: Definition of ServiceAccessInformation resource

| Property name | Type | Cardinality | Description | Applicability |
| --- | --- | --- | --- | --- |
| provisioningSessionId | ResourceId | 1..1 | Unique identification of the M1 Provisioning Session. | All types |
| provisioningSession‌Type | Provisioning‌Session‌Type | 1..1 | The type of Provisioning Session. | All types. |
| locationReporting | boolean | 1..1 | If true, the Media Session Handler or Media AS is required to provide UE location data in Dynamic Policy interactions (see clause 9.3.3.1), Network Assistance interactions (see clause 9.4.3.1), QoE metrics reporting interactions (see clause 9.5.3) and consumption reporting interactions (see clause 9.6.3.2).Shall be set *false* if the locationReporting parameter is omitted from the ProvisioningSession, as specified in table 8.2.3.1‑1. | All types. |
| notificationURL | AbsoluteURL | 0..1 | A URL to the MQTT channel, nominated by the Media AF, over which notifications are to be sent by the Media AF (see clause 10.2). | All types. |
| streamingAccess | object | 0..1 | Present if Content Hosting or Content Publishing is provisioned in the parent Provisioning Session. | MS\_DOWNLINK*,*MS\_UPLINK |
|  | entryPoints | array(Absolute‌Media‌Entry‌Point) | 0..1 | A list of alternative Media Entry Points for the Media Client to choose between. |
|  |  | locator | AbsoluteUrl | 1..1 | Populated from information in the Content Hosting Configuration or Content Publishing Configuration as specified in clause 8 of TS 26.512 [6].- For downlink media streaming, either a pointer to a document at reference point M4 that defines a media presentation (e.g. a DASH MPD) whose resources are mapped to a content ingest configuration at reference point M2, or else the URL of a single media resource (e.g. an MP4 asset) available for download at reference point M4 that is mapped to reference point M2 by a Content Hosting Configuration. In both cases, the contentType property shall also be present.- For uplink media streaming, either a pointer to a document at reference point M4 that defines a media presentation (e.g. a DASH MPD) whose resources are mapped to an egest configuration at reference point M2 (in which case the contentType property shall also be present), or else the URL of a path at reference point M4 the sub-resources of which are mapped to reference point M2 by a Content Publishing Configuration (in which case the protocol property shall also be present). |
|  |  | contentType | string | 1..1 | The MIME content type of resource at locator.This property shall be mutually exclusive with protocol. |  |
|  |  | protocol | Uri | 1..1 | A fully-qualified term identifier URI that identifies the media delivery protocol at reference point M4 for this Media Entry Point.This property shall be mutually exclusive with contentType.The controlled vocabulary of media delivery protocols at this reference point is specified in clause 10 of TS 26.512 [6]. |  |
|  |  | profiles | array(Uri) | 0..1 | 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 | A pointer to an eMBMS User Service Announcement document. |  |
|  | mbs‌External‌Service‌Identifier | string | 0..1 | The external service identifier of an MBS User Service. |  |
| rtcClientConfiguration | object | 0..1 | Present if real-time media communication (RTC) is provisioned. | RTC |
|  | stunEndpoints | array(Client‌Service‌Endpoint‌Access‌Parameters) | 0..1 | An array of one or more trusted STUN service endpoints for use as ICE candidates. If present, the RTC Client shall use one of the listed servers for RTC-based media delivery sessions within the scope of provisioning‌SessionId.If the credentials sub-property was not provisioned at reference point M1, the Media AF shall populate this with a set of credentials unique to the requesting Media Client. |
|  | turnEndpoints | array(Client‌Service‌Endpoint‌Access‌Parameters) | 0..1 | An array of one or more trusted TURN service endpoints for use as ICE candidates. If present, the RTC Client shall use one of the listed servers for RTC-based media delivery sessions within the scope of provisioning‌SessionId.If the credentials sub-property was not provisioned at reference point M1, the Media AF shall populate this with a set of credentials unique to the requesting Media Client. |
|  | swapEndpoints | array(Client‌Service‌Endpoint‌Access‌Parameters) | 0..1 | An array of one or more trusted WebRTC Signalling Function service endpoints that support the SWAP protocol. If present, the RTC Client shall use one of the listed servers for RTC-based media delivery sessions within the scope of provisioning‌SessionId.If the credentials sub-property was not provisioned at reference point M1, the Media AF shall populate this with a set of credentials unique to the requesting Media Client. |
| clientConsumptionReporting‌Configuration | object | 0..1 | Present if consumption reporting is activated for this Provisioning Session. | MS\_DOWNLINK*,*RTC |
|  |  | reportingInterval | DurationSec | 0..1 | The time interval, expressed in seconds, between consumption report messages being sent by the consumption reporting entity. 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 | A list of Media AF addresses (URLs) where the consumption reporting messages are sent by the consumption reporting entity. (See NOTE 1).Each address shall be an opaque base URL, following the format specified in clause 7.1.3 up to and including the {apiVersion} path element. |  |
|  |  | accessReporting | boolean | 1..1 | Indicates whether the consumption reporting entity is required to supply consumption reporting units whenever the access network changes during a media delivery session.Shall be set *false* if the accessReporting parameter is omitted from the Consumption‌Reporting‌Configuration, as specified in table 8.12.3.1‑1. |  |
|  |  | samplePercentage | Percentage | 1..1 | The percentage of media delivery sessions required to report consumption, expressed as a floating-point value between 0.0 and 100.0.Shall be set to 100.0 if the samplePercentage parameter is omitted from the Consumption‌Reporting‌Configuration, as specified in table 8.12.3.1‑1. |  |
| dynamicPolicyInvocation‌Configuration | object | 0..1 | Present if Policy Templates have been provisioned in the parent Provisioning Session and at least one of them is in the READY state. | MS\_DOWNLINK*,*MS\_UPLINK*,*RTC |
|  | serverAddresses | array(AbsoluteUrl) | 1..1 | A list of Media AF addresses (URLs) which offer the APIs for dynamic policy invocation. (See NOTE 1.)Each address shall be an opaque base URL, following the format specified in clause 7.1.3 up to and including the {apiVersion} path element. |  |
|  | policyTemplateBindings | array(object) | 1..1 | A list of duples, each one binding an external reference to a Policy Template resource identifier. |  |
|  |  | externalReference | string | 1..1 | 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". |  |
|  |  | policyTemplateId | ResourceId | 1..1 | The resource identifier of a Policy Template tagged with externalReference that is in the READY state. |  |
|  |  | pduSetMarking | boolean | 0..1 | If *true*, indicates that PDU Set marking applies to Dynamic Policy Instances based on policyTemplateId.Default value false if omitted. |  |
|  |  | downlink‌Data‌Burst‌Size‌Marking‌Required | boolean | 0..1 | If true, indicates that data burst size marking of downlink PDUs is required for Dynamic Policy Instances based on policyTemplateId*.*Default value falseif omitted. |  |
|  |  | downlink‌Time‌To‌Next‌Burst‌Marking‌Required | boolean | 0..1 | If true, indicates that time to next burst marking of downlink PDUs is required for Dynamic Policy Instances based on policyTemplateId*.*Default value falseif omitted. |  |
|  |  | downlink‌Expedited‌Transfer‌Indication‌Marking‌Required | boolean | 0..1 | If true*,* indicates that expedited transfer indication marking of downlink PDUs is required for Dynamic Policy Instances based on policyTemplateId.Default value false if omitted. |  |
|  |  | bdtWindows | array(BdtWindow) | 0..1 | A list of Background Data Transfer time windows during which the application may request the activation of a Background Data Transfer policy by instantiating the Policy Template identified by policyTemplateId. The actual usage quotas for data volume and bit rate are determined by the Media AF upon instantiation of the Policy Template.BdtWindow is specified in clause 7.3.3.14. |  |
|  | sdfMethods | array(SdfMethod) | 1..1 | A list of Service Data Flow description methods, e.g. 5-tuple, TOS, 2-tuple, etc., to be used to describe the application flows at reference point M2 or M12 for media delivery sessions. |  |
| clientMetricsReporting‌Configurations | array(object) | 0..1 | Present if QoE metrics reporting is provisioned in the parent Provisioning Session.If present, contains one or more client metrics reporting configurations. | MS\_DOWNLINK*,*MS\_UPLINK*,*RTC |
|  | metricsReporting‌ConfigurationId | ResourceId | 1..1 | The identifier of this metrics reporting configuration, unique within the scope of the parent Provisioning Session.The value shall be the same as the corresponding identifier provisioned at reference point M1 (see clause 8.11.3.1). |
|  | serverAddresses | array(AbsoluteUrl) | 1..1 | A list of Media AF addresses to which metrics reports shall be sent. (See NOTE 1).Each address shall be an opaque base URL, following the format specified in clause 7.1.3 up to and including the {apiVersion} path element. |
|  | sliceScope | array(Snssai) | 0..1 | The set of network slice(s) for which metrics collection and reporting shall be executed in connection with this metrics reporting configuration (see NOTE 2).If present, the array shall identify at least one network slice.If absent, metrics shall be collected and reported for media delivery sessions within the scope of the parent Provisioning Session regardless of network slice. |
|  | scheme | Uri | 1..1 | A URI identifying the metrics scheme that metrics reports shall use (see clause 5.2.11).The set of QoE metrics schemes valid for use in 5G Media Streaming along with their respective scheme identifiers is specified in clauses 4.7.5 and 7.8.1 of TS 26.512 [6].The QoE metrics scheme valid for use in RTC along with its respective scheme identifier is specified in clause 15 of TS 26.113 [7]. |
|  | dataNetworkName | Dnn | 0..1 | The name of the Data Network which shall be used to send metrics reports.If not specified, the default Data Network shall be used. |
|  | reportingStartOffset | DurationSec | 0..1 | The time offset (expressed in seconds) from the start of a media delivery session when the metrics reporting entity is required to begin submitting metrics reports.If omitted, the value of this parameter is assumed to be zero, i.e., directing the Media Client to start reporting metrics from the start of the media delivery session. |
|  | reportingDuration | DurationSec | 0..1 | The period of time (expressed in seconds) measured relative to the reporting start point, after which the metrics reporting entity is required to stop reporting metrics.If omitted, reporting is required to continue until the end of the media delivery session. |
|  | reportingInterval | DurationSec | 0..1 | The time interval, expressed in seconds, between metrics reports being sent by the metrics reporting entity. 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 | The percentage of media delivery sessions required to report QoE metrics, expressed as a floating-point value between 0.0 and 100.0. |
|  | positive‌Crossing‌Thresholds | map(Uri -> array(Float)) | 0..1 | If present, a non-empty map of QoE metrics to their respective threshold values.- The index of the associative array shall be the fully-qualified term identifier URI of a metric specified in annex E of TS 26.512 [6] or annex C of TS 26.113 [7].- The value of each associative array member shall be an array of floating-point threshold values.A metric in this associative array shall be reported once when its value exceeds one of the associated threshold values, and shall not be reported again until it falls below that threshold and subsequently exceeds it. |
|  | negative‌Crossing‌Thresholds | map(Uri -> array(Float)) | 0..1 | If present, a non-empty map of QoE metrics to their respective threshold values.- The index of the associative array shall be the fully-qualified term identifier URI of a metric specified in annex E of TS 26.512 [6] or annex C of TS 26.113 [7].- The value of each associative array member shall be an array of floating-point threshold values.A metric in this associative array shall be reported once when its value falls below one of the associated threshold values, and shall not be reported again until it exceeds that threshold and subsequently falls below it. |
|  | location‌Filter | array(LocationArea5G) | 0..1 | A list of one or more locations (see NOTE 3) where QoE metrics collection is required. When present, a Media Client shall collect metrics only when it is located in these locations and shall report them according to the other properties of the enclosing client metrics reporting configuration.If omitted, QoE metrics are to be collected and reported regardless of the UE location. |
|  | urlFilters | array(string) | 0..1 | A non-empty list of Media Entry Point URL patterns for which QoE metrics shall be reported. The format of each pattern shall be a regular expression as specified in [36].If not specified, reporting shall be done for all media delivery sessions. |
|  | samplingPeriod | DurationSec | 1..1 | The time interval the Media Client is required to wait between sampling the QoE metrics specified by this metrics reporting configuration. |
|  | metrics | array(Uri) | 0..1 | A list of one or more QoE metrics, each indicated by a fully-qualified term from a controlled vocabulary, which are to be reported.If omitted, the complete (or default if applicable) set of metrics associated with the specified scheme shall be collected and reported. |
| networkAssistance‌Configuration | object | 0..1 | Present if Network Assistance is provisioned in the parent Provisioning Session. | MS\_DOWNLINK*,*MS\_UPLINK*,*RTC |
|  | serverAddresses | array(AbsoluteUrl) | 1..1 | A list of Media AF addresses (URLs) that offer the APIs for AF-based Network Assistance at reference point M5. (See NOTE 1.)Each address shall be an opaque URL, following the format specified in clause 7.1.3 up to and including the {apiVersion} path element. |
| client‌EdgeResources‌Configuration | object | 0..1 | Present only for Provisioning Sessions with client-driven edge computing management mode provisioned. | MS\_DOWNLINK*,*MS\_UPLINK*,*RTC |
|  | eligibilityCriteria | Edge‌Processing‌Eligibility‌Criteria | 0..1 | Conditions for activating edge resources for media delivery sessions in the scope of the parent Provisioning Session. (See clause 7.3.3.10.) |
|  | easDiscoveryTemplate | EAS‌Discovery‌Template | 1..1 | A template for the EAS discovery filter that shall be used by the EEC to discover and select a Media EAS instance to serve media delivery sessions at reference point M4 in the scope of the parent Provisioning Session. (See clause 9.2.3.3.) |
|  | easRelocation‌Requirements | Client‌EAS‌Relocation‌Requirements | 0..1 | EAS relocation tolerance and requirements.If absent, the EEC shall assume that relocation is tolerated by all Media EAS instances in the scope of the parent Provisioning Session. (See clause 9.2.3.4.) |
| NOTE 1: In deployments where multiple instances of the Media AF expose the Media Session Handling APIs at reference point M5, the 5G System may use a suitable mechanism (e.g., HTTP load balancing or DNS-based host name resolution) to direct requests to a suitable Media AF instance.NOTE 2: The Snssai data type is specified in TS 29.571 [33].NOTE 3: The LocationArea5G data type is specified in TS 24.558 [14]. |

Dynamic Policy API

#### 9.3.3.1 DynamicPolicy resource

Table 9.3.3.1-1: Definition of Dynamic Policy Instance resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property name | Data type | Cardinality | Usage | Description |
| dynamicPolicyId | ResourceId | 1..1 | RO | Unique identifier for this Dynamic Policy Instance assigned by the Media AF when the resource is created. |
| provisioningSessionId | ResourceId | 1..1 | C: ROR: ROU: RO | Uniquely identifies the parent Provisioning Session, which is linked to the Application Service Provider. |
| session‌Id | MediaDelivery‌SessionId | 1..1 | C: RWR:ROU: RO | Unique identifier of the current media delivery session. |
| policyTemplateId | ResourceId | 1..1 | C: RWR: ROU: RW | Identifies the Policy Template to be applied to the application flow(s) that fall within the scope of this Dynamic Policy Instance. |
| sliceInfo | Snssai | 0..1 | C: RWR: ROU: RW | Identifying the target slice in which the Policy Template is instantiated. |
| dataNetworkName | Dnn | 0..1 | C: RWR: ROU: RW | The name of the target Data Network in which the Policy Template is instantiated. |
| location | TypedLocation | 0..1 | C: RWR: ROU: RW | The location of the UE when the Dynamic Policy was created or last updated. |
| applicationFlowBindings | array(Application‌FlowBinding) | 1..1 | C: RWR: ROU: RW | The bindings between application flows at reference point M4 managed within the scope of this Dynamic Policy Instance and their network Quality of Service requirements (see clause 9.3.3.2).The array shall contain at least one member. |
|  | componentIdentifier | string | 1..1 | C: RWR: ROU: RW | References a particular service component in the Policy Template. |
|  | application‌Flow‌Description | Application‌Flow‌Description | 1..1 | C: RWR: ROU: RW | The Dynamic Policy invoker's specification of an application flow managed by this Dynamic Policy to be used for application traffic identification purposes in the 5G Core (see clause 7.3.3.2).When PDU Set handling and/or dynamically changing traffic characteristics are required by for the Policy Template identified by policyTemplateId, this property shall also specify the media transport protocol parameters to be used by the Media Access Function for PDU Set and/or dynamically changing traffic characteristics signalling purposes.When media flow multiplexing is in use on the described application flow, this property shall also specify the media identification information parameters to be used by the Media Access Function for multiplexed media identification signalling purposes. |
|  | qos‌Specification | Client‌Policy‌Specification | 0..1 | C: RWR: ROU: RW | The Dynamic Policy invoker's network Quality of Service requirements of the application flow described by application‌Flow‌Description.If omitted, the default provisioned network Quality of Service requirements of the Policy Template indicated in policyTemplateId shall apply to application‌Flow‌Description. |
| bdtSpecification | Client‌Bdt‌Specification | 0..1 | C: RWR: ROU: RW | The Background Data Transfer time windows and traffic limits that apply to this Dynamic Policy (see clause 9.3.3.3). |
| qosEnforcement | boolean | 1..1 | C: ROR: ROU: RO | Indication that the Quality of Service described in qosSpecification is being enforced by the 5G System.Populated by the Media AF. |

3GPP Forge tag bump

# A.1 General

The normative code specifying the APIs defined in clauses 7.3, 8, 9 and 10 of the present document, including JSON Schema [38] representations of HTTP message bodies to be used with these APIs, is published on 3GPP Forge according to the OpenAPI 3.0.0 specification [32]. The YAML files corresponding to this version of the present document shall be published to the following location:

https://forge.3gpp.org/rep/all/5G\_APIs/-/tags/TSG109-Rel19

Informative copies of these YAML files shall be distributed with the present document for convenience only. Where any discrepancy exists, the version on 3GPP Forge shall be considered definitive.

QoS mapping for dynamic policy at N5

## D.1.2 QoS mapping for Dynamic Policy at reference point N5

When the Media AF directly invokes the Npcf\_PolicyAuthorization service at reference point N5 according to TS 29.514 [18], each DynamicPolicy resource is mapped by the Media AF to an Application‌Session‌Context resource in the PCF.

Two alternative implementation options exist for the mapping of the ApplicationFlowBinding object by the Media AF:

1. Each Application‌Flow‌Binding object of the Dynamic Policy Instance (each one representing a distinct Service Component) is associated with a different Media‌Component object in the PCF, as shown in figure D.1.2‑1. A single MediaSubComponent is created to describe the downlink and/or uplink aspects of that Service Component.

NOTE 1: As specified in clause 5.5.3.3.3, the dynamic traffic characteristics (i.e., data burst size, time to next burst and expedited transfer indication) are mapped to the dat‌Burst‌Size‌Ind, time‌to‌Next‌Burst‌Ind, and exp‌Tran‌Ind properties respectively of a Media‌Component object. These reflect the values of corresponding Policy‌Constraints properties downlink‌Data‌Burst‌Size‌Marking‌Required, downlink‌Time‌To‌Next‌Burst‌Marking‌Required, and respectively, of the corresponding Application‌Flow‌Binding’s client QoS specification of downlink‌Expedited‌Transfer‌Indication. When any of these are present, the mediaTransportParameters are further associated with the protoDescDl property of the Media‌Component object.

2. In the limited case where all Service Components share the same minimum desired bit rate, minimum requested bit rate, PDU Set QoS requirements and dynamic traffic characteristics (data burst size and/or time to next burst) marking, and none of the Policy‌Constraints objects cites a qosReference, each Application‌Flow‌Binding object of the Dynamic Policy Instance (each one representing a distinct Service Component) is associated with a different Media‌Sub‌Component object in the PCF, and these all share a common parent Media‌Component object, as shown in figure D.1.2-2.

NOTE 2: The dynamic traffic characteristic of expedited transfer indication is not applicable to this limited case as different QoS requirements are expected between corresponding expedited and non-expedited Application‌Flow‌Binding objects.

In both options, the descriptions of the downlink and/or uplink application flow are populated in the fDescs array of the MediaSubComponent unless a qosReference is cited in the corresponding Policy‌Constraints.

End of changes