**3GPP TSG- Meeting #**

**, , -** revision of S4-250726

|  |
| --- |
| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  |
| *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)*.* |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network | **X** |

|  |
| --- |
|  |
| ***Title:***  |  |
|  |  |
| ***Source to WG:*** | , Lenovo |
| ***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:*** | 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 identification-tag (the values of "mid" attribute) in the SDP information. The RTP SDES header extension for MID make it possible for a 5G System or an RTP receiver to associate each PDU or PDU Set to a media stream when the the PDUs in a PDU Set carry the RTP SDES header extension for MID. 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 multiplexed media identification information for media streams. |
|  |  |
| ***Summary of change:*** | Updated the application flow description resource to include the details of media stream identifier *SDES RTP Compact Header Extension* in protocol description. Updated the dynamic policy provisioning and policy control interactions to include the multiplexed media identification signaling information. |
|  |  |
| ***Consequences if not approved:*** | Recommendations from work item description are not met, key 5GA features are not supported. |
|  |  |
| ***Clauses affected:*** | 5.3.3.2, 5.5.3, 7.3.3.2 and 9.3.3.1 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  |  |
| ***affected:*** |  | **X** |  Test specifications |  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** | rev 1: |
|  |  |
| ***This CR's revision history:*** | Removed the multiplexed media identification feature provisioning through provisining interface. |

Changes to dynamic policy instance operation

#### 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 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.

 When multiple media flows are multiplexed into a single application flow, the Dynamic Policy invoker may also populate the mediaTransportParameters property with the *media identification information* parameters to be used by the 5G System for traffic detection and differentiated QoS. This is not further specified in the present document.

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.

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 Policy control interactions for Dynamic Policies

The Dynamic Policies feature operates at reference point M5 between the Media Session Handler in the Media Client and a Media AF that has been appropriately provisioned with Policy Templates (see clause 5.2.7). The Dynamic Policy API at reference point M5 (see clauses 5.3.3 and 9.3) is specified in a generic way such that the associated functionality in the 5GC may be realised by various means.

NOTE 1: This clause does not limit the possible set of 5G System exposure functionalities for realising dynamic policies.

In this release, the Media AF converts Dynamic Policies API invocations received at reference point M5 into direct or indirect invocations of the Policy Authorization Service exposed by the PCF, and converts responses from the PCF into their equivalents at reference point M5 for return to the Media Session Handler.

To realise dynamic policies, the Media AF shall interact with the PCF using one of the following methods:

A. If the Media AF is deployed in the Trusted DN, it may directly invoke the Npcf\_Policy‌Authorization service at reference point N5, as specified in TS 29.514 [18].

NOTE 2: It is the responsibility of the Media AF in this case to discover and track changes to the PCF instance responsible for the PDU Session supporting the media streaming session at reference point M4 using the discovery services provided by the NRF and/or BSF.

B. If the Media AF is deployed outside the Trusted DN, or if it is more convenient for a Media AF deployed in the Trusted DN to do so, it invokes the Nnef\_AFSession‌With‌QoS and/or Nnef\_Chargeable‌Party services exposed by the NEF, as specified in clauses 4.4.9 and 4.4.8 respectively of TS 29.522 [19], to indirectly invoke the PCF at reference point N33.

NOTE 3: Per clause 4.4.9 of TS 29.522 [19], the Nnef\_AFSession‌With‌QoS service is realised at reference point N33 by the AsSession‌With‌QoS exposure API. Similarly, the Nnef\_Chargeable‌Party service is realised by the Chargeable‌Party exposure API per clause 4.4.8 of [19].

NOTE 4: Configuration of the NEF endpoint address and access credentials in the Media AF in this case is beyond the scope of the present document.

When the first Dynamic Policy is created by the Media Session Handler for a particular media delivery session (per clause 5.3.3.2), the Media AF shall create an *AF application session context* in the PCF responsible for the PDU Session corresponding to the M4 application flows indicated in the DynamicPolicy.‌application‌Flow‌Bindings array.

If no corresponding AF application session context already exists, the Media AF shall use the Npcf\_‌Policy‌Authorization\_‌Create operation at reference point N5 (or, if deployed outside the Trusted DN, the equivalent Nnef\_AFsession‌WithQoS service operation) with the appropriate service information to create and provision a new AF application session context. The information in the AppSessionContext‌ReqData shall be derived from the application flow descriptions in the Dynamic Policy Instance resource and/or the requested QoS.

The mapping of application flows listed in the DynamicPolicy.‌application‌Flow‌Bindings array to media components and sub-components of the AF application session context is implementation-dependent.

[If the pduSetQoSLimits property is populated in QosRange.‌downlink‌QoS‌Specification, then the Media‌Component.‌pduSetQosDl object shall be populated as follows by the Media AF:

- The pduSetDelayBudget property shall be set to the larger value of pduSetQoSLimits.‌pduSetDelayBudget and desiredDownlink‌PduSet‌QosParameters.‌pduSetDelayBudget.

- The pduSetErrorRate property shall be set to the larger value of pduSetQoSLimits.pduSetErrorRate and desiredDownlink‌PduSet‌QosParameters.‌pduSetErrorRate.

- The pduSetHandlingInfo property shall be set to the value of pduSetQoSLimits.pduSetHandlingInfo, ignoring the value of desiredDownlink‌PduSet‌QosParameters.‌pduSetHandlingInfo, if any.

Otherwise, the Media‌Component.‌pduSetQosDl object shall be populated directly from the desiredDownlink‌PduSet‌QosParameters object.

If the pduSetQoSLimits property is populated in QosRange.‌uplink‌QoS‌Specification, then the Media‌Component.‌pduSetQosUl object shall be populated as follows by the Media AF:

- The pduSetDelayBudget property shall be set to the larger value of pduSetQoSLimits.‌pduSetDelayBudget and desiredUplink‌PduSet‌QosParameters.‌pduSetDelayBudget.

- The pduSetErrorRate property shall be set to the larger value of pduSetQoSLimits.‌pduSetErrorRate and desiredUplink‌PduSet‌QosParameters.‌pduSetErrorRate.

- The pduSetHandlingInfo property shall be set to the value of pduSetQoSLimits.‌pduSetHandlingInfo, ignoring the value of desiredUplink‌PduSet‌QosParameters.‌pduSetHandlingInfo, if any.

Otherwise, the Media‌Component.‌pduSetQosUl object shall be populated directly from the desiredUplink‌PduSet‌QosParameters object.]

##### 5.5.3.3.X Mapping of multiplexed media flow information

When multiple media flows are multiplexed into a single application flow, then the Media‌Component.‌medSubComps array shall include a MediaSubComponent object describing each media flow and this shall be populated as follows:

- The afSigProtocol property shall be set to SIP????.

- The marBwDl and marBwUl properties shall be set to to the maximum requested bandwidth for the Uplink and downlink respectively for each media subcomponent flow.

- The mpxMediaInfos property shall contain a copy of the corresponding MpxMediaInfo objects provided in mediaTransportParameters.mpxMediaInfoList.

For each of the Dynamic Policy Instances it is managing, the Media AF shall subscribe to the following PCF notifications on the corresponding AF application session context:

- Service Data Flow QoS notification control;

- Service Data Flow deactivation;

- Resources allocation outcome.

When requesting QoS provisioning for a media delivery session, the Media AF shall use the configured Policy Template of the Dynamic Policy Instance to determine the list of the QoS references within altSerReqs. The lowest priority index shall be assigned to the Policy Template with the lowest QoS requirement, and the highest priority shall be assigned to the Service Operation Point requested by the UE (if the UE is allowed to use that operation point).

When instantiating a Policy Template that has a Background Data Transfer policy, the Media AF needs to populate some of the properties in the ClientBdtSpecification object specified in clause 9.3.3.3 for inclusion in the Dynamic Policy Instance resource returned to the Media Session Handler at reference point M5.

Where the Policy Template references an existing Background Data Transfer policy by including the bdtPolicyId property, in order to populate the properties of the ClientBdtSpecification object the Media AF shall first retrieve the individual Background Data Transfer policy resource referenced by bdtPolicyId from the PCF. The Npcf\_‌BDT‌Policy‌Control service operation specified in clause 5.3.3.3.1 of TS 29.554 [46] shall be used for this purpose.

When a dynamic policy is subsequently destroyed by the Media Session Handler (per clause 4.7.3), the Media AF shall destroy the corresponding AF application session context in the relevant PCF instance.

Changes to 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 end of data burst detection and/or multiplexed media identification on this application flow (see NOTE 2). |
| 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]. |

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

Changes to Dynamic Policy Resource

#### 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 is enabled 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 signalling purposes.When media flow multiplexing is in use on the described application flow, this property shall also specify the media transport protocol parameters to be used by the Media Access Function for multiplexed media identification signalling purposes. |
|  | qos‌Specification | Client‌Qos‌Specification | 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. |

End of changes