**3GPP TSG-CT WG3 Meeting #122-eC3-223166**

**E-Meeting, 12th – 20th May 2022**

**Source: Nokia, Nokia Shanghai Bell**

**Title: Pseudo-CR on the Authorized QoS related update to Npcf\_MBSPolicyControl Create Service**

**Spec: 3GPP TS 29.537 V0.2.0**

**Agenda item: 17.31 (5MBS)**

**Document for: Approval**

**1. Introduction**

TS 29.537 has been allocated under the 5MBS work item to define the MBS Policy Control services.

**2. Reason for Change**

Authorized QoS related update for Npcf\_MBSPolicyControl\_Create service operation needs to be specified as per below stage 2 requirements.

Stage 2 requirements for policy data are defined in TS 23.247:

## *6.10    Policy control for Multicast and Broadcast services*

*The policy and charging control framework as defined in TS 23.503 [7] applies to Multicast and Broadcast services in the following aspects:*

*-     MBS Session binding: MBS Session binding is the association of an AF Session information to one and only one MBS Session. The PCF shall perform the session binding based on the MBS Session ID, i.e. TMGI or source specific IP multicast address.*

*-     QoS Flow binding: For an MBS Session, QoS Flow binding is the association of a PCC rule to a QoS Flow within an MBS Session. The MB-SMF performs QoS Flow binding for an MBS Session in the same way as the SMF for a PDU Session.*

*-* ***PCC rules for MBS Session are used to provide policy for QoS flows: The following PCC rule parameters defined in Table 6.3.1 of TS 23.503 [7] are applicable for MBS:***

***-     Rule identifier.***

***-     Service data flow detection: Precedence, Service data flow template (only for IP PDU traffic).***

***-     Policy Control: 5G QoS Identifier (5QI), DL-maximum bitrate, DL-guaranteed bitrate, ARP, Priority Level, Averaging Window, Maximum Data Burst Volume.***

***-     Policy information can also be applicable for an entire MBS session. The following parameters defined for a PDU session in Table 6.4.1 of TS 23.503 [7] are applicable for an entire MBS session:***

***-     Authorized Session-AMBR.***

***-     Explicitly signalled QoS Characteristics.***

**3. Conclusions**

N/A.

**4. Proposal**

It is proposed to agree the following changes to 3GPP TS 29.537 V0.2.0.

\* \* \* First Change \* \* \* \*

#### 5.2.X.d MBS authorized QoS

##### 5.2.X.d.1 General

The PCF shall provision the MBS authorized QoS. The MBS authorized QoS may apply to a MBS PCC rule or to a MBS session.

- When the MBS authorized QoS applies to a MBS PCC rule, it shall be provisioned within the corresponding MBS PCC rule as defined in the clause 5.2.2.x.4.2.

- When the MBS authorized QoS applies to a MBS session, it shall be provisioned as defined in the clause 5.2.2.x.3.

- When the MBS authorized QoS applies to an explicitly signalled QoS Characteristics, it shall be provisioned as defined in the clause 5.2.2.x.4.3.

Editor's note: Handling of Default QoS and Session AMBR applicable to MBS session is FFS.

The MBS authorized QoS provides appropriate values for the resources to be enforced. The MBS authorized QoS for a MBS PCC rule is a request for allocating the corresponding resources. The Provisioning of MBS authorized QoS per MBS PCC rule is a part of MBS PCC rule provisioning procedure.

The MB-SMF shall interact with the (R)AN (if applicable), and MB-UPF for enforcing the policy based authorization.

All the parameters of the MBS authorized QoS may be changed.

NOTE 1: A change of 5QIs cannot be described as an upgrade or downgrade and also no 5QI can be referred to as the higher or lower. Whether the 5QI is permitted to be changed or not is subject to both operator policies and normal restrictions on changing from a non-GBR 5QI value to GBR 5QI value on an IP flow.

NOTE 2: All attributes of the ARP QoS parameter can be changed but only the ARP priority level represents an ordered range of values. The ARP priority level attribute represents the actual priority for the service/user with the value 1 as the highest and can thus be upgraded and downgraded.

If the PCF is unable to make a decision for the response to the HTTP POST message by the MB-SMF, the PCF may reject the request as described in the clause 6.1.7.

\* \* \* Next Change \* \* \* \*

##### 5.2.X.d.1 Policy provisioning and enforcement of MBS authorized QoS per MBS service data flow

The Provisioning of MBS authorized QoS per MBS service data flow is a part of MBS PCC rule provisioning procedure, as described in the clause 5.2.2.x.2.

The MBS authorized QoS per MBS service data flow shall be provisioned within a MbsQosInfo data structure. The PCF shall include a "mbsQosInfos" attribute containing the corresponding MBS QoS information decision within the MbsPolicyDecision data structure and include the reference to this MBS QoS information decision within the "refMbsQosInfo" attribute of the MbsPccRule data instance.

Within the MBS QoS Information decision, for 5QI of GBR type, the PCF shall include the authorized GBR 5QI or delay critical GBR 5QI respectively within the "5qi" attribute, the ARP within the "arp" attribute, and max bandwidth in downlink within the "mbrDl" attribute, the guaranteed bandwidth in downlink within the "gbrDl" attribute.

Within the MBS QoS information decision, for 5QI of non-GBR type, the PCF shall include the authorized non-GBR 5QI within the "5qi" attribute and the ARP within the "arp" attribute. The PCF may authorize the max bandwidth in downlink within the "mbrDl" attribute.

When the PCF authorizes a standardized 5QI but a Priority Level, an Averaging Window and/or a Maximum Data Burst Volume which are different from the standardized value in the table 5.7.4-1 of 3GPP TS 23.501 [2] are required, the PCF shall include the Priority Level within the "priorityLevel" attribute, the Averaging Window within the "averWindow" attribute and/or the Maximum Data Burst Volume within the "mbsMaxDataBurstVol" attribute.

NOTE 1: For the non-standardized or non-configured 5QI, the PCF needs to authorize explicitly signalled QoS Characteristics associated with the 5QI if the PCF has not provisioned it.

The MB-SMF shall reserve the resources necessary for the guaranteed bitrate for the MBS PCC rule upon receipt of a MBS PCC rule provisioning including QoS information. For GBR QoS flows the MB-SMF should set the MBS QoS flow's GBR to the sum of the GBRs of all MBS PCC rules that are active/installed and bound to that GBR QoS flow. For GBR QoS flow the MB-SMF should set the MBS QoS flow's MBR to the sum of the MBRs of all MBS PCC rules that are active/installed and bound to that GBR QoS flow.

The MB-SMF shall assign a QFI if a new MBS QoS flow needs to be established and shall derive, if applicable, the MBS QoS profile required towards the Access Network, and the MBS QoS information with PDRs towards to the MB-UPF.

If one or more of the 5QI, ARP, Priority level, Averaging Window and Maximum Data Burst Volume attributes of a MBS PCC rule are modified to the same updated values for all the MBS PCC rules bound to the same MBS QoS flow, then the MB-SMF should modify the corresponding attributes for that impacted MBS QoS flow.

Editor's note: Handling of pre-defined MBS PCC rules is FFS.

\* \* \* Next Change \* \* \* \*

###### 5.2.2.x.4.3 Policy provisioning and enforcement of authorized explicitly signalled MBS QoS Characteristics

The PCF may provision a dynamically assigned 5QI value (from the non-standardized and non-preconfigured value range) and the associated 5G QoS characteristics to the MB-SMF. In order to do so, the PCF shall include within the MbsPolicyDecision data structure the "mbsQosChars" attribute to contain one or more authorized signalled MbsQosChar instance(s). For each MbsQosChar instance, the PCF shall include the assigned 5QI value within the "5qi" attribute, the 5QI Priority Level value within the "priorityLevel" attribute, the Packet Delay Budget value within the "packetDelayBudget" attribute, the Packet Error Rate value within the "packetErrorRate" attribute, the Averaging Window value within the "averWindow" attribute, if applicable, and the Maximum Data Burst Volume value within the "mbsMaxDataBurstVol" attribute, if applicable. If the PCF has provisioned an authorized signalled MbsQosChar instance to the MB-SMF, the PCF shall not update nor remove it during the lifetime of the policy association.

NOTE:      Operator configuration is assumed to ensure that the assigned dynamic 5QI value is unique and references the same set of QoS characteristics within the whole PLMN at a given time.

\* \* \* Next Change \* \* \* \*

#### 6.1.6.1 General

This clause specifies the application data model supported by the API.

Table 6.1.6.1-1 specifies the data types defined for the Npcf\_MBSPolicyControl service based interface protocol.

Table 6.1.6.1-1: Npcf\_MBSPolicyControl specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| MbsPolicyCtxtData | 6.1.6.2.2 | Contains the parameters used to request the creation of an Individual MBS Policy resource. |  |
| MbsPolicyData | 6.1.6.2.4 | Contains the MBS policy data of an Individual MBS Policy resource. |  |
| MbsPolicyDecision | 6.1.6.2.3 | Contains the MBS policies authorized by the PCF. |  |
| MbsPolicyNotif | 6.1.6.2.5 | Represents an MBS policy update notification. |  |
| MbsQosChar | 6.1.6.2.x | Represents explicitly signalled  QoS characteristics. |  |
| MbsTermNotif | 6.1.6.2.6 | Represents an MBS policy termination notification. |  |

Table 6.1.6.1-2 specifies data types re-used by the Npcf\_MBSPolicyControl service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Npcf\_MBSPolicyControl service based interface.

Table 6.1.6.1-2: Npcf\_MBSPolicyControl re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| Dnn | TS 29.571 [15] | Identifies a DNN. |  |
| MbsSessionId | TS 29.571 [15] | Represents an MBS Session Identifier. |  |
| PacketDelBudget | TS 29.571 [15] | Indicates Packet Delay Budget. |  |
| PacketErrRate | TS 29.571 [15] | Indicates Packet Error Rate. |  |
| QosResourceType | TS 29.571 [15] | Indicates whether a QoS Flow is non-GBR, delay critical GBR, or non-delay critical GBR |  |
| RedirectResponse | TS 29.571 [15] | Contains redirection related information. |  |
| Snssai | TS 29.571 [15] | Identifies an S-NSSAI. |  |
| SupportedFeatures | TS 29.571 [15] | Represents the list of supported features. It is used to negotiate the applicability of the optional features. |  |
| Uri | TS 29.571 [15] | Represents a URI. |  |

\* \* \* Next Change \* \* \* \*

##### 6.1.6.2.a Type: MbsQosChar

Table 6.1.6.2.a-1: Definition of type MbsQosChar

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| 5qi | 5Qi | M | 1 | Identifier for the MBS authorized QoS parameters for the MBS service data flow. Applies to MBS PCC rule and MBS session level. |  |
| resourceType | QosResourceType | M | 1 | Indicates whether the resource type is GBR, delay critical GBR, or non-GBR. |  |
| priorityLevel | 5QiPriorityLevel | M | 1 | Unsigned integer indicating the 5QI Priority Level, within a range of 1 to 127. |  |
| packetDelayBudget | PacketDelBudget | M | 1 | Unsigned integer indicates the packet delay budget. Packet Delay Budget expressed in milliseconds. |  |
| packetErrorRate | PacketErrRate | M | 1 | String indicating the packet error rate.  Examples:  Packer Error Rate 4x10-6 shall be encoded as "4E-6".  Packer Error Rate 10-2 shall be encoded as"1E-2". |  |
| averWindow | AverWindow | C | 0..1 | Indicates the averaging window.  This IE shall be present only for a GBR QoS flow or a Delay Critical GBR QoS flow. |  |
| mbsMaxDataBurstVol | MbsMaxDataBurstVol | M | 1 | Unsigned Integer. Indicates the maximum data burst volume. |  |

\* \* \* Next Change \* \* \* \*

# A.2 Npcf\_MBSPolicyControl API

openapi: 3.0.0

info:

title: Npcf\_MBSPolicyControl API

version: 1.0.0-alpha.2

description: |

MBS Session Policy Control Service

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externalDocs:

description: >

TS 29.537 V0.2.0; 5G System; Multicast/Broadcast Policy Control Services.

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.537/'

security:

- {}

- oAuth2ClientCredentials:

- npcf-mbspolicycontrol

servers:

- url: '{apiRoot}/npcf-mbspolicycontrol/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501.

paths:

/mbs-policies:

post:

summary: Request the creation of a new Individual MBS Policy resource.

operationId: CreateMBSPolicy

tags:

- MBS Policies (Collection)

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/MbsPolicyCtxtData'

responses:

'201':

description: >

Created. An Individual MBS Policy resource is successfully created and

a representation of the created resource is returned.

content:

application/json:

schema:

$ref: '#/components/schemas/MbsPolicyData'

headers:

Location:

description: >

Contains the URI of the newly created Individual MBS Policy resource.

required: true

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29571\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29571\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

callbacks:

MbsPolicyUpdateNotification:

'{$request.body#/notificationUri}/update':

post:

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/MbsPolicyNotif'

responses:

'204':

description: >

No Content. The MBS Policy Update Notification was successfully received.

'307':

$ref: 'TS29571\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29571\_CommonData.yaml#/components/responses/308'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29571\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29571\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

MbsPolicyTerminationNotification:

'{$request.body#/notificationUri}/terminate':

post:

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/MbsTermNotif'

responses:

'204':

description: >

No Content. The notification was successfully received.

'307':

$ref: 'TS29571\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29571\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29571\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29571\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

/mbs-policies/{mbsPolicyId}:

get:

summary: Read an Individual MBS Policy.

operationId: GetMBSPolicy

tags:

- Individual MBS Policy (Document)

parameters:

- name: mbsPolicyId

in: path

description: >

Contains the identifier of the concerned Individual MBS Session Policy Association.

required: true

schema:

type: string

responses:

'200':

description: >

OK. The requested Individual MBS Policy resource is successfully returned.

content:

application/json:

schema:

$ref: '#/components/schemas/MbsPolicyData'

'307':

$ref: 'TS29571\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29571\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29571\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29571\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

delete:

summary: Deletes an existing Individual MBS Policy resource.

operationId: DeleteMBSPolicy

tags:

- Individual MBS Policy

parameters:

- name: mbsPolicyId

in: path

description: >

Contains the identifier of the concerned Individual MBS Session Policy.

required: true

schema:

type: string

responses:

'204':

description: >

No Content. The concerned Individual MBS Policy resource was successfully deleted.

'307':

$ref: 'TS29571\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29571\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29571\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29571\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

npcf-mbspolicycontrol: Access to the Npcf\_MBSPolicyControl API

schemas:

MbsPolicyCtxtData:

description: >

Contains the parameters used to request the creation of an Individual MBS

Policy resource.

type: object

properties:

mbsSessionId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MbsSessionId'

dnn:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

snssai:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

notificationUri:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

suppFeat:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

required:

- mbsSessionId

- dnn

- snssai

- notificationUri

MbsPolicyData:

description: Contains the MBS policy data of an Individual MBS Policy resource.

type: object

properties:

mbsPolicyCtxtData:

$ref: '#/components/schemas/MbsPolicyCtxtData'

suppFeat:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

required:

- mbsPolicyCtxtData

MbsPolicyNotif:

description: Represents an MBS Policy Update Notification.

type: object

properties:

mbsSessionId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MbsSessionId'

required:

- mbsSessionId

MbsTermNotif:

description: Represents an MBS Policy Termination Notification.

type: object

properties:

mbsSessionId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/MbsSessionId'

cause:

$ref: '#/components/schemas/MbsPolicyAssociationReleaseCause'

required:

- mbsSessionId

- cause

MbsQosChar:

description: Represents explicitly signalled  QoS characteristics..

type: object

properties:

5qi:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/5Qi'

resourceType:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/QosResourceType'

priorityLevel:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/5QiPriorityLevel'

packetDelayBudget:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PacketDelBudget'

packetErrorRate:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/PacketErrRate'

averWindow:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/AverWindow'

mbsMaxDataBurstVol:

$ref: '#/components/schemas/MbsMaxDataBurstVol'

required:

- 5qi

- resourceType

- priorityLevel

- packetDelayBudget

- packetErrorRate

- mbsMaxDataBurstVol

# ENUMS:

MbsPolicyAssociationReleaseCause:

description: >

Represents the cause due to which the PCF requests the termination of the MBS policy

association.

anyOf:

- type: string

enum:

- UNSPECIFIED

\* \* \* End of Changes \* \* \* \*