**3GPP TSG CT WG3 Meeting #127eC3-231151**

E-Meeting, 17th – 21st April, 2023 (revision of C3-23xxxx)

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **29.512** | **CR** | **1056** | **rev** | **-** | **Current version:** | **18.1.0** |  |
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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 |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | Group related data rate policy control | | | | | | | | | |
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| ***Source to WG:*** | China Telecom | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
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| ***Work item code:*** | GMEC | | | | |  | ***Date:*** | | | 2023-04-17 |
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| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
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| ***Reason for change:*** | | As described in S2-2301809, Group related policy control is supported and is similar to Network Slice related policy control. | | | | | | | | |
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| ***Summary of change:*** | | Add Group MBR related policy control in PCF. | | | | | | | | |
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| ***Consequences if not approved:*** | | Group MBR related policy control can not be supported in PCF. | | | | | | | | |
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| ***Clauses affected:*** | | 4.2.2.1, 4.2.2.x(new), 4.2.3.1, 4.2.3.x(new), 4.2.4.1, 4.2.4.x(new), 4.2.5.1, 4.2.5.x(new), 4.2.6.x(new), 4.2.6.x.1(new), 4.2.6.x.2(new), 5.7.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | This CR does not impact the OpenAPI file. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**Additional discussion(if needed):**

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**Proposed changes:**

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| **First change** |

#### 4.2.2.1 General

The Npcf\_SMPolicyControl\_Create service operation provides means for the SMF to request the creation of a corresponding SM Policy Association with PCF.

The Session Management procedures of the SMF and related policies are defined in 3GPP TS 23.501 [2], 3GPP TS 23.502 [3] and 3GPP TS 23.503 [6].

The following procedures using the Npcf\_SMPolicyControl\_Create service operation are supported:

- Request the creation of a corresponding SM Policy Association with the PCF.

- Provisioning of PCC rules.

- Provisioning of policy control request triggers.

- Provisioning of charging related information for a PDU session.

- Provisioning of revalidation time.

- Policy provisioning and enforcement of authorized AMBR per PDU session.

- Policy provisioning and enforcement of authorized default QoS.

- Provisioning of PCC rule for Application Detection and Control.

- 3GPP PS Data Off Support.

- IMS Emergency Session Support.

- Request Usage Monitoring Control.

- Access Network Charging Identifier report.

- Request for the successful resource allocation notification.

- Provisioning of IP Index Information.

- Negotiation of the QoS flow for IMS signalling.

- PCF resource cleanup.

- Access traffic steering, switching and splitting support.

- DNN Selection Mode Support.

- Detection of the SM Policy Association enabling Time Sensitive Communications, Time Synchronization and Deterministic Networking.

- Support of Dual Connectivity end to end redundant User Plane paths.

- User Plane Remote Provisioning of UE SNPN Credentials in Onboarding Network.

- Network slice related data rate policy control.

- Request of Presence Reporting Area Change Report.

- Group related data rate policy control.

When the EMDBV feature defined in clause 5.8 is supported by both the PCF and the SMF, the PCF shall use the extMaxDataBurstVol attribute instead of the maxDataBurstVol attribute to signal maximum data burst volume values higher than 4095 Bytes.

When the EMDBV feature is supported by the PCF but not supported by the SMF and the PCF needs to signal maximum data burst volume values higher than 4095 Bytes, the PCF shall use the maxDataBurstVol attribute set to 4095 Bytes.

For values lower than or equal to 4095 Bytes, the PCF shall use the maxDataBurstVol attribute.

NOTE: Maximum data burst volume values are sent by the PCF in responses to the SMF or in an SM Policy Association Update request i.e. after feature negotiation, so the PCF knows whether the SMF supports the EMDBV feature.

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| **Next change** |

#### 4.2.2.x Group related data rate policy control

When an Npcf\_SMPolicyControl\_Create request is received, the PCF may check if the DNN and S-NSSAI to which the received request relates is subject to group data rate policy control. If it is the case, the PCF shall apply group data rate control as described in clause 4.2.6.x.

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| **Next change** |

#### 4.2.3.1 General

The UpdateNotify service operation provides updated Session Management related policies to the NF service consumer (SMF) or triggers the deletion of the context of SM related policies. The POST method is used for both update and terminate operations.

The following procedures using the Npcf\_SMPolicyControl\_UpdateNotify service operation are supported:

- PCF initiated update of the policies associated with a PDU session.

- PCF initiated deletion of the SM Policy Association of a PDU session.

- Provisioning of PCC rules.

- Provisioning of policy control request triggers.

- Provisioning of revalidation time.

- Policy provisioning and enforcement of the authorized AMBR per PDU session.

- Policy provisioning and enforcement of the authorized default QoS.

- Provisioning of PCC rules for Application Detection and Control.

- 3GPP PS Data Off Support.

- IMS Emergency Session Support.

- Request Access Network Information.

- Request Usage Monitoring Control.

- Request for the result of PCC rule removal.

- Access Network Charging Identifier request.

- Request successful resource allocation notifications.

- IMS Restoration Support.

- P-CSCF Restoration Enhancement Support.

- Access traffic steering, switching and splitting support.

- Policy provisioning and enforcement of AF session with required QoS.

- Forwarding of TSC user plane node management information and port management information received from the TSN AF or TSCTSF.

- Provisioning of TSCAI input information and TSC QoS related data.

- Policy provisioning of QoS Monitoring to assist URLLC Service.

- Policy decision and condition data error handling.

- Network slice related data rate policy control.

- Request of Presence Reporting Area Change Report.

- PCC Rule Error Report.

- Session Rule Error Report.

- Group related data rate policy control.

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| **Next change** |

#### 4.2.3.x Group related data rate policy control

At the time a PCF-initiated change of the authorized Session-AMBR occurs or PCC Rule(s) for GBR service data flow(s) need to be provisioned at the SMF, the PCF may check if the concerned DNN and S-NSSAI is subject to group data rate policy control. If it is the case, the PCF shall apply group data rate control as described in clause 4.2.6.x.

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| **Next change** |

#### 4.2.4.1 General

The Npcf\_SMPolicyControl\_Update service operation provides means for the NF service consumer to inform the PCF that a policy control request trigger condition has been met and for the PCF to inform the NF service consumer of any resulting update of the Session Management related policies.

The following procedures using the Npcf\_SMPolicyControl\_Update service operation are supported:

- Provisioning of PCC rules.

- Provisioning of policy control request triggers.

- Request the policy based on revalidation time.

- Policy provisioning and enforcement of authorized AMBR per PDU session.

- Policy provisioning and enforcement of authorized default QoS.

- Application detection information reporting.

- Indication of QoS Flow Termination Implications.

- 3GPP PS Data Off Support.

- Request and report Access Network Information.

- Request Usage Monitoring Control and report Accumulated Usage.

- Ipv6 Multi-homing support.

- Request and report the result of PCC rule removal.

- Access Network Charging Identifier Request and report.

- Request and report the successful resource allocation notification.

- Negotiation of the QoS flow for IMS signalling.

- Notification about Service Data Flow QoS target enforcement.

- Request the termination of SM Policy association.

- Reporting of TSC user plane node management information and port management information.

- QoS Monitoring Report.

- Policy decision and condition data error handling.

- Request the policy after DDN failure events.

- Network slice related data rate policy control.

- Presence Reporting Area Information Report.

- PCC Rule Error Report.

- Session Rule Error Report.

- UE initiates a resource modification support.

- Trace Control.

- Group related data rate policy control.

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| **Next change** |

#### 4.2.4.x Group related data rate policy control

When an Npcf\_SMPolicyControl\_Update request that requires a change of the authorized Session-AMBR and/or MBR update(s) for PCC Rule(s) corresponding to GBR service data flow(s) is received, the PCF may check if the DNN and S-NSSAI to which the received request relates is subject to group data rate policy control. If it is the case, the PCF shall apply group data rate control as described in clause 4.2.6.x.

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| **Next change** |

#### 4.2.5.1 General

The delete service operation provides means for the NF service consumer to delete the policy context associated with a PDU Session.

The following procedures using the Npcf\_SMPolicyControl\_Delete service operation are supported:

- Deletion of the policy context associated with a PDU session.

- Report Accumulated Usage.

- Report Access Network Information.

- Report Service Data Flow QoS Monitoring.

- Network slice related data rate policy control.

- Group related data rate policy control.

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| **Next change** |

#### 4.2.5.x Group related data rate policy control

When an Npcf\_SMPolicyControl\_Delete request is received, the PCF may check if the DNN and S-NSSAI to which the received request relates is subject to group data rate policy control. If it is the case, the PCF shall apply group data rate control as described in clause 4.2.6.x.

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| **Next change** |

#### 4.2.6.x Group related data rate policy control

##### 4.2.6.x.1 General

A PCF that supports group related data rate policy control shall be able to control and manage the data rate per group identified by DNN and S-NSSAI. In order to do so, the PCF shall perform the same procedures as the ones defined for slice related data rate policy control defined in clauses 4.2.6.8, with the following differences:

- Only the PCF-based method is applicable for group related data rate policy control, i.e. the provisions of clause 4.2.6.8.3 shall not apply for group related data rate policy control.

- The provisions related to slice related data rate policy control for an S-NSSAI apply for group related data rate policy control for a DNN and S-NSSAI combination and a group of UE(s).

- Instead of handling Maximum Slice Data Rate per S-NSSAI, the UDR and PCF handles the Maximum Group-MBR per group of UE(s) and DNN and S-NSSAI combination.

- Instead of deducting the value of the authorized Session-AMBR and the MBR of every GBR SDF for every PDU Session of a slice, the PCR deducts such value for every PDU Session established/updated/released for the concerned group of UE(s) and DNN and S-NSSAI combination.



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| **Next change** |

### 5.7.3 Application Errors

The application errors defined for the Npcf\_SMPolicyControl API are listed in table 5.7.3-1 and 5.7.3-2.

Table 5.7.3-1: Application errors when PCF acts as a server

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| Application Error | HTTP status code | Description |
| USER\_UNKNOWN | 400 Bad Request | The HTTP request is rejected because the end user specified in the request is unknown to the PCF. (NOTE 1) (NOTE 3) |
| ERROR\_INITIAL\_PARAMETERS | 400 Bad Request | The HTTP request is rejected because the set of session or subscriber information needed by the PCF for rule selection is incomplete or erroneous or not available for the decision to be made. (E.g. QoS, RAT type, subscriber information) (NOTE 1) (NOTE 2) (NOTE 3) |
| ERROR\_TRIGGER\_EVENT | 400 Bad Request | The HTTP request is rejected because the set of session information sent the message originated due to a trigger been met is incoherent with the previous set of session information for the same session. (E.g. trigger met was RAT changed, and the RAT notified is the same as before) (NOTE 2) (NOTE 3) |
| PENDING\_TRANSACTION | 400 Bad Request | This error shall be used when the PendingTransaction feature is supported and the PCF receives an incoming request on a policy association while it has an ongoing transaction on the same policy association and cannot handle the request as described in clause 9.2 of 3GPP TS 29.513 [7]. (NOTE 2) |
| ERROR\_TRAFFIC\_MAPPING\_INFO\_REJECTED | 403 Forbidden | The HTTP request is rejected because the PCF does not accept one or more of the traffic mapping filters provided by the NF service consumer in a PCC Request. (NOTE 2) (NOTE 3) |
| ERROR\_CONFLICTING\_REQUEST | 403 Forbidden | The HTTP request is rejected because the PCF cannot accept the UE-initiated resource request as a network-initiated resource allocation is already in progress that has packet filters that cover the packet filters in the received UE-initiated resource request. The NF service consumer shall reject the attempt for UE-initiated resource request. (NOTE 2) (NOTE 3) |
| LATE\_OVERLAPPING\_REQUEST | 403 Forbidden | The request is rejected because it collides with and exiting Policy Association with a more recent originating timestamp. (NOTE 1) |
| POLICY\_CONTEXT\_DENIED | 403 Forbidden | The HTTP request is rejected because the PCF does not accept the NF service consumer request due to operator policies and/or local configuration. (NOTE 1) (NOTE 2) (NOTE 3) |
| VALIDATION\_CONDITION\_NOT\_MET | 403 Forbidden | The HTTP request is rejected because the PCF does not accept the NF service consumer request because the validation condition of background data transfer policy is not met. (NOTE 1) (NOTE 3) |
| INVALID\_BDT\_POLICY | 403 Forbidden | The HTTP request is rejected because the PCF does not accept the NF service consumer request because the background data transfer policy is invalid. (NOTE 1) |
| EXCEEDED\_UE\_SLICE\_DATA\_RATE | 403 Forbidden | The HTTP request is rejected because the PCF does not accept the NF service consumer request because the authorized data rate exceeds the consumed data rate for that UE and network slice. (NOTE 1) (NOTE 2) |
| EXCEEDED\_SLICE\_DATA\_RATE | 403 Forbidden | The HTTP request is rejected because the PCF does not accept the NF service consumer request because the authorized data rate exceeds the consumed data rate for that slice. (NOTE 1) (NOTE 2) |
| EXCEEDED\_GROUP\_DATA\_RATE | 403 Forbidden | The HTTP request is rejected because the PCF does not accept the NF service consumer request because the authorized data rate exceeds the consumed data rate for that group. (NOTE 1) (NOTE 2) |
| POLICY\_ASSOCIATION\_NOT\_FOUND | 404 Not Found | The HTTP request is rejected because no policy association corresponding to the request exists in the PCF. (NOTE 2) |
| NOTE 1: These application errors are used by the create service operation (see clause 4.2.2.2) and included in the responses to the POST request.  NOTE 2: These application errors are used by the update service operation (see clause 4.2.4.2) and included in the responses to the POST request.  NOTE 3: The Cause codes mapping performed by NF service consumer between this Application Error and the 5GSM related value is specified in clause 5.2.2.2 of 3GPP TS 29.524 [40].  NOTE 4: Including a "ProblemDetails" data structure with the "cause" attribute in the HTTP response is optional unless explicitly mandated in the service operation clauses. | | |

Table 5.7.3-2: Application errors when NF service consumer acts as a server to receive a notification

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| Application Error | HTTP status code | Description |
| PCC\_RULE\_EVENT | 400 Bad Request | The HTTP request is rejected because all the PCC rules provisioned by the PCF in the request cannot be installed/activated. It is used to inform the PCF that the request failed, and should not be attempted again. (NOTE 1) |
| PCC\_QOS\_FLOW\_EVENT | 400 Bad Request | The HTTP request is rejected because for some reason all the PCC rules provisioned by the PCF in the request cannot be enforced or modified successfully in a network initiated procedure. It is used to inform the PCF that the request could not be satisfied at the time it was received, but may be able to satisfy the request in the future. (NOTE 1) |
| UE\_STATUS\_SUSPEND | 400 Bad Request | The HTTP request is rejected because the UE's status is suspended and the policy decisions received from the PCF cannot be enforced by the NF service consumer. Applicable only to functionality introduced with the PolicyUpdateWhenUESuspends feature as described in clause 5.8. (NOTE 1) |
| RULE\_PERMANENT\_ERROR | 400 Bad Request | The HTTP request is rejected because all the PCC rules and/or session rules provisioned by the PCF in the request cannot be installed/activated. It is used to inform the PCF that the request failed, and should not be attempted again. Applicable only to functionality introduced with the SessionRuleErrorHandling feature as described in clause 5.8. (NOTE 1) |
| RULE\_TEMPORARY\_ERROR | 400 Bad Request | The HTTP request is rejected because for some reason all the PCC rules and/or session rules provisioned by the PCF in the request cannot be enforced or modified successfully in a network initiated procedure. It is used to inform the PCF that the request could not be satisfied at the time it was received, but may be able to satisfy the request in the future. Applicable only to functionality introduced with the SessionRuleErrorHandling feature as described in clause 5.8. (NOTE 1) |
| PENDING\_TRANSACTION | 400 Bad Request | This error shall be used when the PendingTransaction feature is supported and the NF service consumer receives an incoming request on a policy association while it has an ongoing transaction on the same policy association and cannot handle the request as described in clause 9.2 of 3GPP TS 29.513 [7]. (NOTE 1) |
| AN\_GW\_FAILED | 400 Bad Request | This error shall be used when SGWRest feature is supported and the received policy decisions (i.e. installation/modification of PCC rules or session rules) cannot be enforced by the SMF because the AN-Gateway has failed. (NOTE 1) |
| POL\_DEC\_ERROR | 400 Bad Request | This error shall be used when Ext2PolicyDecisionErrorHandling feature is supported, the PCF provides only SM policy decisions and/or condition data and all the policy decisions and/or conditions in the request cannot be stored in the NF service consumer. |
| NOTE 1: These application errors are used by the UpdateNotify service operation (see clause 4.2.3.2) and included in the responses to the POST request.  NOTE 2: Including a "ProblemDetails" data structure with the "cause" attribute in the HTTP response is optional unless explicitly mandated in the service operation clauses. | | |

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| **Next change** |

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| **End of changes** |