**3GPP TSG-CT3 Meeting #127e *C3-231383***

**E-Meeting, 17th - 21st April 2023**

|  |
| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **29.512** | **CR** | **1075** | **rev** | **-** | **Current version:** | **18.1.0** |  |
|  |
| *For* ***[HE](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)******[LP](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)*** *on using this form: comprehensive instructions can be found at <http://www.3gpp.org/Change-Requests>.* |
|  |

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

|  |
| --- |
|  |
| ***Title:***  | Update Npcf\_SMPolicyControl Service for support of new QoS monitoring parameters |
|  |  |
| ***Source to WG:*** | China Mobile |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | XRM |  | ***Date:*** | 2022-04-09 |
|  |  |  |  |  |
| ***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 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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | As per SP-230247 in SA2#155, the QoS monitoring parameters are updated to introduce support of 5GS information exposure for XRM services (i.e. congestion information).Npcf\_SMPolicyControl Service update has to be reflected in stage 3. |
|  |  |
| ***Summary of change:*** | Npcf\_SMPolicyControl Service QoS monitoring related parameters are updated. |
|  |  |
| ***Consequences if not approved:*** | There is an inconsistency between SA2 and CT3 in terms of . Npcf\_SMPolicyControl Service parameters for 5GS information exposure for XRM services. |
|  |  |
| ***Clauses affected:*** | 4.2.3.25, 4.2.4.24, 5.6.2.40, 5.6.2.42, 5.6.3.21, A.2  |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **N** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **N** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **N** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** | This CR introduce backward compatible feature in the Npcf\_SMPolicyControl API. |
|  |  |
| ***This CR's revision history:*** |  |

\* \* \* \* First change \* \* \* \*

#### 4.2.3.25 Policy provisioning of QoS Monitoring control

The QoS Monitoring control refers to the real time measurement of QoS parameters between the UE and the UPF for a QoS flow.

If the "QosMonitoring" feature is supported, the PCF may generate the authorized QoS Monitoring data decision for the service data flow based on the QoS Monitoring request if received from the AF and may determine whether the QoS monitoring report is sent to the AF/NEF by the SMF bypassing the PCF or by the PCF. When the feature "ExposureToEAS" is supported and the AF indication of direct notification is received, the PCF may determine whether duplicate notification by the UPF is required, i.e., whether the QoS monitoring report is directly sent to the local AF/NEF and to the PCF/SMF.

The PCF shall include within the SmPolicyDecision data structure one or more QosMonitoringData instances within the "qosMonDecs" attribute if not provided yet and, if the PCF determines that the QoS monitoring report shall be sent by the PCF from the SMF, "QOS\_MONITORING" within the "policyCtrlReqTriggers" attribute, if it has not been provisioned yet.

NOTE 1: The QoS monitoring report can be sent by the SMF to the PCF as described in clause 4.2.4.24. The QoS monitoring report of the PCF to the AF/NEF is described in 3GPP TS 29.514 [17], the QoS monitoring report of the SMF to the AF/NEF bypassing the PCF is described in 3GPP TS 29.508 [12] and the QoS monitoring report to the Local NEF/AF by the UPF is described in 3GPP TS 29.564 [50].

When the features "QoSMonitoring" and " NscSupportedFeatures" are supported and if the NEF/AF provided information about the support of "QoSMonitoring" feature on Nsmf\_EventExposure service, the PCF may also include this information within the "nscSuppFeats" attribute included within the PccRule data type.

For each QosMonitoringData instance, PCF shall include:

- the requested QoS monitoring parameter(s) to be measured (i.e. DL/UL/ round trip packet delay and/or congestion information) within the "reqQosMonParams" attribute;

- the frequency(s) of reporting (e.g. event triggered, periodic, or when the PDU Session is released, and/or any combination) within the "repFreqs" attribute;

- for the case the "repFreqs" attribute includes the value "EVENT\_TRIGGERED", for QoS monitoring for packet delay:

- the delay threshold for downlink with the "repThreshDl" attribute if "reqQosMonParams" attribute includes DOWNLINK;

- the delay threshold for uplink with the "repThreshUl" attribute if "reqQosMonParams" attribute includes UPLINK; and/or

- the delay threshold for round trip with the "repThreshRp" attribute if "reqQosMonParams" attribute includes ROUND\_TRIP; and

- the minimum waiting time between subsequent reports within the "waitTime" attribute; and

- if the feature "PacketDelayFailureReport" or "XRM\_5G" is supported, the maximum period with no QoS measurement results reported within the"repPeriod" attribute;

- for the case the "repFreqs" attribute includes "PERIODIC", the periodic time for reporting and, if the feature "PacketDelayFailureReport" or "XRM\_5G" is supported, the maximum period with no QoS measurement results reported within the "repPeriod" attribute; and

- either the notification URI within the "notifyUri" attribute and the notification correlation id within the "notifyCorreId" attribute if the PCF determines that the notification shall be sent to the AF directly from the SMF or the notification URI within the "notifyUri" attribute, the notification correlation id within the "notifyCorreId" attribute corresponding to the Local NEF or AF and the "directNotifInd" attribute set to true if the feature "ExposureToEAS" is supported and the PCF determines that the direct notification by the UPF to the Local NEF or AF is required based on the indication of direct notification received from the AF.

Editor’s note: It is FFS whether new data type structure is needed for QoS monitoring control for multi-modal services.

NOTE 2: If the feature "ExposureToEAS" is supported and if the PCF determines to receive QoS Monitoring report while direct UPF notification is also required, the PCF can provision the "QOS\_MONITORING" policy control request trigger to the SMF together with the "directNotifInd" attribute set to true.

The PCF shall include the value of QoS Monitoring Data ID of QosMonitoringData instance within the "refQosMon" attribute of the corresponding PCC rule and provide the QoS monitoring data decision together with the PCC rule if it has not been provisioned to the SMF. When the SMF receives the PCC rule, the SMF shall send a QoS Monitoring request to the PSA UPF via N4 as defined in 3GPP TS 29.244 [13] and NG-RAN via N2 signalling to request the QoS monitoring between PSA UPF and NG-RAN as defined in 3GPP TS 29.502 [22]. If the feature "ExposureToEAS" is supported and if the SMF receives both the "QOS\_MONITORING" policy control request trigger and the indication of direct notifcation, the SMF shall request the UPF to perform duplicated notification as defined in 3GPP TS 29.244 [13].

If the PCF receives the request from the local NEF/AF to disable the QoS monitoring from the AF or the Local NEF, the PCF shall update the PCC rule with the "refQosMon" attribute set to NULL. The PCF may also remove the corresponding QoS Monitoring Data if no PCC rule is referring to it.

If the PCF receives the request to disable the direct event notification to the local NEF or AF by the UPF, the PCF shall determine whether the PCF or the SMF bypassing the PCF sends the QoS monitoring reports to the local AF/NEF:

a. if the QoS monitoring reports are sent by the SMF bypassing the PCF:

- update the PCC rule with the "refQosMon" attribute referring a QosMonitoringData instance which does not include the "directNotifInd" attribute set to true and still includes the "notifyUri", and the "notifyCorreId" attributes; or

- update the corresponding QosMonitoringData instance by including the "directNotifInd" attribute set to false and still keeping the "notifyUri", and the "notifyCorreId" attributes;

b. if the QoS monitoring reports are sent by the PCF:

- update the PCC rule with the "refQosMon" attribute referring a QosMonitoringData instance which does not include the "directNotifInd", the "notifyUri", and the "notifyCorreId" attributes or update the QosMonitoringData instance by removing the "directNotifInd", the "notifyUri", and the "notifyCorreId" attributes; and

- provision the value "QOS\_MONITORING" within the "policyCtrlReqTriggers" attribute, if not previously provided.

The SMF shall request to the UPF to disable the notification to the AF/(Local)NEF via N4 as defined in 3GPP TS 29.244 [13] and shall start sending the related notifications to PCF or to the indicated Notification URI and notification correlation Id, as applicable.

If the PCF determines that QoS monitoring report shall be sent to the PCF from the SMF instead of sent from the SMF bypassing the PCF, the PCF shall replace the QosMonitoringData instance with an instance that does not include the "notifyUri" and the "notifyCorreId" attributes and include "QOS\_MONITORING" within the "policyCtrlReqTriggers" attribute if it has not been provisioned yet. If the PCF determines that QoS monitoring report shall be sent from the SMF bypassing the PCF instead of sent from the SMF to the PCF, the PCF shall update the QosMonitoringData instance by including the the notification URI within the "notifyUri" attribute and the notification correlation id within the "notifyCorreId" attribute, and remove the value "QOS\_MONITORING" within the "policyCtrlReqTriggers" attribute.

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

#### 4.2.4.24 Notification about Service Data Flow QoS Monitoring

When the SMF gets the information about real-time measurements of QoS parameters for one or more SDFs from the UPF and the "QOS\_MONITORING" policy control request trigger was provisioned, then SMF shall inform the PCF for the impacted PCC rules

When the QoS monitoring applies for packet delay, the SMF shall inform the PCF when it gets information about any of the following items for one or more SDFs from the UPF:

- uplink packet delay(s);

- downlink packet delay(s); and/or

- round trip delay(s); or

- if the feature "PacketDelayFailureReport" is supported, indicator of packet delay measurement failure.

When the QoS monitoring applies for congestion information, the SMF shall inform the PCF when it gets information about any of the following items for one or more SDFs from the UPF:

- congestion information; or

- if the feature "XRM\_5G" is supported, indicator of congestion information measurement failure.

The SMF shall send an HTTP POST request to the PCF with an SmPolicyUpdateContextData data structure, including the "QOS\_MONITORING" within "repPolicyCtrlReqTriggers" attribute and the "qosMonReports" attribute. In each QosMonitoringReport data structure, the PCF shall include:

- affected PCC rule identifiers within the "refPccRuleIds" attribute;

and, if QoS monitoring is for packet delay, the PCF shall include:

- one or two uplink packet delays within the "ulDelays" attribute; and/or

- one or two downlink packet delays within the "dlDelays" attribute; and/or

- one or two round trip packet delays within the "rtDelays" attribute; and/or

- one or two congestion information within the "CongInfo" attribute; or

- if the feature "PacketDelayFailureReport" is supported, the packet delay measurement failure indicator within "pdmf" attribute; or

- if the feature "XRM\_5G" is supported, the congestion information measurement failure indicator within "cimf" attribute.

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

#### 5.6.2.40 Type QosMonitoringData

Table 5.6.2.40-1: Definition of type QosMonitoringData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| qmId | string | M | 1 | Univocally identifies the QoS monitoring policy data within a PDU session. |  |
| reqQosMonParams | array(RequestedQosMonitoringParameter) | M | 1..N | Indicates QoS information to be monitored, e.g.the UL packet delay, DL packet delay, round trip packet delay and/or congestion information between the UE and the UPF is to be monitored when the QoS Monitoring is enabled for the service data flow. (NOTE 1) | QoSMonitoringXRM\_5G |
| repFreqs | array(ReportingFrequency) | M | 1..N | Indicates the frequency for the reporting, such as event triggered, periodic, when the PDU Session is released, and/or any combination. |  |
| repThreshDl | integer | O | 0..1 | Indicates the threshold in units of milliseconds for DL packet delay. Only applicable when the "reqQosMonParams" attribute includes the "DOWNLINK" value and the "repFreqs" attribute includes the value "EVENT\_TRIGGERED".Minimum = 0. |  |
| repThreshUl | integer | O | 0..1 | Indicates the threshold in units of milliseconds for UL packet delay. Only applicable when the "reqQosMonParams" attribute includes the "UPLINK" value and the "repFreqs" attribute includes the value "EVENT\_TRIGGERED".Minimum = 0. |  |
| repThreshRp | integer | O | 0..1 | Indicates the threshold in units of milliseconds for round trip packet delay. Only applicable when the "reqQosMonParams" attribute includes the "ROUND\_TRIP" value and the "repFreqs" attribute includes the value "EVENT\_TRIGGERED".Minimum = 0. |  |
| waitTime | DurationSecRm | O | 0..1 | Indicates the minimum waiting time between subsequent reports. Only applicable when the "repFreqs" attribute includes the value "EVENT\_TRIGGERED". |  |
| repPeriod | DurationSecRm | O | 0..1 | Indicates the reporting period. Only applicable when the "repFreqs" attribute includes the value "PERIODIC".If the feature "PacketDelayFailureReport" is supported, it also indicates the time interval at which a measurement failure needs to be reported if no measurement result is provided. Only applicable when the "repFreqs" attribute includes the value "PERIODIC" and "EVENT\_TRIGGERED". |  |
| notifyUri | UriRm | O | 0..1 | Notification address of the AF or if the "ExposureToEAS" feature is supported, of the Local NEF or AF receiving the event notification. It shall be included if the PCF determines that the notification shall be sent to the AF directly from the NF service consumer or the PCF determines that the notification shall be sent to the Local NEF or AF directly from the UPF. (NOTE 2). |  |
| notifyCorreId | string | O | 0..1 | It is used to set the value of Notification Correlation ID in the notification sent by the NF service consumer or, if the "ExposureToEAS" feature is supported, the UPF. It may be included if the PCF determines that the notification shall be sent to the AF directly from the NF service consumer or the PCF determines that the notification shall be sent to the Local NEF or AF directly from the UPF. (NOTE 2). |  |
| directNotifInd | boolean | O | 0..1 | Indicates that the direct event notification sent to the Local NEF or AF by the UPF is requested if it is included and set to true. | ExposureToEAS |
| NOTE 1: In this release of the specification the maximum number of elements in the array is 3.NOTE 2: The attributes "notifyUri" and "notifyCorreId' shall not be set to NULL if the "ExposureToEAS" feature is not supported. |

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

#### 5.6.2.42 Type QosMonitoringReport

Table 5.6.2.42-1: Definition of type QosMonitoringReport

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| refPccRuleIds | array(string) | M | 1..N | An array of PCC rule id references to the PCC rules associated with the QoS Monitoring report. |  |
| ulDelays | array(integer) | O | 1..N | Uplink packet delay in units of milliseconds. (NOTE 1) |  |
| dlDelays | array(integer) | O | 1..N | Downlink packet delay in units of milliseconds. (NOTE 1) |  |
| rtDelays | array(integer) | O | 1..N | Round trip delay in units of milliseconds. (NOTE 1) |  |
|  |  |  |  |  |  |
| CongInfo | array(float) | O | 1..N | Percentage of packets that UPF uses for ECN marking for L4S (without "%" sign). (NOTE 1)(NOTE 3) | XRM\_5G |
| pdmf | boolean | O | 0..1 | Packet delay measurement failure indicator. When set to true, it indicates that a packet delay failure has occurred.Default value is false if omitted. (NOTE 2) | PacketDelayFailureReport |
| cimf | boolean | O | 0..1 | Congestion information measurement failure indicator. When set to true, it indicates that a congestion information failure has occurred.Default value is false if omitted. (NOTE 3) | XRM\_5G |
| NOTE 1: In this release of the specification the maximum number of elements in the array is 2. If more than one value is received at one given point of time for UL packet delay, DL packet delay or round trip packet delay respectively, the NF service consumer reports the minimum and maximum packet delays to the PCF; when more than one value is sent at one given point of time for congestion information, they represent the minimum and maximum congestion information.NOTE 2: When the "pdmf" attribute is set to true, "ulDelays", "dlDelays", and "rtDelays" shall not be present.NOTE 3: When the "cimf" attribute is set to true, "CongInfo" shall not be present. |

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

#### 5.6.3.21 Enumeration RequestedQosMonitoringParameter

Table 5.6.3.21-1: Enumeration RequestedQosMonitoringParameter

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| DOWNLINK | Indicates the DL packet delay between the UE and the UPF is to be monitored. |  |
| UPLINK | Indicates the UL packet delay between the UE and the UPF is to be monitored. |  |
| ROUND\_TRIP | Indicates the round trip packet delay between the UE and the UPF is to be monitored. |  |
| CONGESTION\_INFO | Indicated the percentage of packets that UPF uses for ECN marking for L4S is to be monitored (without "%" sign). | XRM\_5G |

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

# A.2 Npcf\_SMPolicyControl API

openapi: 3.0.0

info:

 title: Npcf\_SMPolicyControl API

 version: 1.3.0-alpha.2

 description: |

 Session Management Policy Control Service

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externalDocs:

 description: 3GPP TS 29.512 V18.1.0; 5G System; Session Management Policy Control Service.

 url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.512/'

security:

 - {}

 - oAuth2ClientCredentials:

 - npcf-smpolicycontrol

servers:

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

 variables:

 apiRoot:

 default: https://example.com

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

paths:

 /sm-policies:

 post:

 summary: Create a new Individual SM Policy.

 operationId: CreateSMPolicy

 tags:

 - SM Policies (Collection)

 requestBody:

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '201':

 description: Created

 content:

 application/json:

 schema:

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

 headers:

 Location:

 description: Contains the URI of the newly created resource.

 required: true

 schema:

 type: string

 '308':

 description: Permanent Redirect

 headers:

 Location:

 description: >

 Contains the URI of the PCF within the existing PCF binding information stored in

 the BSF for the same UE ID, S-NSSAI and DNN combination.

 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'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 callbacks:

 SmPolicyUpdateNotification:

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

 post:

 requestBody:

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '200':

 description: >

 OK. The current applicable values corresponding to the policy control request

 trigger is reported.

 content:

 application/json:

 schema:

 oneOf:

 - $ref: '#/components/schemas/UeCampingRep'

 - type: array

 items:

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

 minItems: 1

 - type: array

 items:

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

 minItems: 1

 '204':

 description: No Content, Notification was succesfull

 '307':

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

 '308':

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

 '400':

 description: Bad Request.

 content:

 application/json:

 schema:

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

 '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'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 SmPolicyControlTerminationRequestNotification:

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

 post:

 requestBody:

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '204':

 description: No Content, Notification was successful

 '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'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 /sm-policies/{smPolicyId}:

 get:

 summary: Read an Individual SM Policy

 operationId: GetSMPolicy

 tags:

 - Individual SM Policy (Document)

 parameters:

 - name: smPolicyId

 in: path

 description: Identifier of a policy association.

 required: true

 schema:

 type: string

 responses:

 '200':

 description: OK. Resource representation is returned.

 content:

 application/json:

 schema:

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

 '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'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 /sm-policies/{smPolicyId}/update:

 post:

 summary: Update an existing Individual SM Policy

 operationId: UpdateSMPolicy

 tags:

 - Individual SM Policy (Document)

 requestBody:

 required: true

 content:

 application/json:

 schema:

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

 parameters:

 - name: smPolicyId

 in: path

 description: Identifier of a policy association.

 required: true

 schema:

 type: string

 responses:

 '200':

 description: OK. Updated policies are returned

 content:

 application/json:

 schema:

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

 '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'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 /sm-policies/{smPolicyId}/delete:

 post:

 summary: Delete an existing Individual SM Policy.

 operationId: DeleteSMPolicy

 tags:

 - Individual SM Policy (Document)

 requestBody:

 required: true

 content:

 application/json:

 schema:

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

 parameters:

 - name: smPolicyId

 in: path

 description: Identifier of a policy association.

 required: true

 schema:

 type: string

 responses:

 '204':

 description: No content

 '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'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '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-smpolicycontrol: Access to the Npcf\_SMPolicyControl API

 schemas:

 SmPolicyControl:

 description: >

 Contains the parameters used to request the SM policies and the SM policies authorized by

 the PCF.

 type: object

 properties:

 context:

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

 policy:

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

 required:

 - context

 - policy

 SmPolicyContextData:

 description: Contains the parameters used to create an Individual SM policy resource.

 type: object

 properties:

 accNetChId:

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

 chargEntityAddr:

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

 gpsi:

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

 supi:

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

 invalidSupi:

 type: boolean

 description: >

 When this attribute is included and set to true, it indicates that the supi attribute

 contains an invalid value.This attribute shall be present if the SUPI is not available

 in the SMF or the SUPI is unauthenticated. When present it shall be set to true for an

 invalid SUPI and false (default) for a valid SUPI.

 interGrpIds:

 type: array

 items:

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

 minItems: 1

 pduSessionId:

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

 pduSessionType:

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

 chargingcharacteristics:

 type: string

 dnn:

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

 dnnSelMode:

 $ref: 'TS29502\_Nsmf\_PDUSession.yaml#/components/schemas/DnnSelectionMode'

 notificationUri:

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

 accessType:

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

 ratType:

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

 addAccessInfo:

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

 servingNetwork:

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

 userLocationInfo:

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

 ueTimeZone:

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

 pei:

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

 ipv4Address:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

 ipv6AddressPrefix:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

 ipDomain:

 type: string

 description: Indicates the IPv4 address domain

 subsSessAmbr:

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

 authProfIndex:

 type: string

 description: Indicates the DN-AAA authorization profile index

 subsDefQos:

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

 vplmnQos:

 $ref: 'TS29502\_Nsmf\_PDUSession.yaml#/components/schemas/VplmnQos'

 numOfPackFilter:

 type: integer

 description: Contains the number of supported packet filter for signalled QoS rules.

 online:

 type: boolean

 description: >

 If it is included and set to true, the online charging is applied to the PDU session.

 offline:

 type: boolean

 description: >

 If it is included and set to true, the offline charging is applied to the PDU session.

 3gppPsDataOffStatus:

 type: boolean

 description: >

 If it is included and set to true, the 3GPP PS Data Off is activated by the UE.

 refQosIndication:

 type: boolean

 description: If it is included and set to true, the reflective QoS is supported by the UE.

 traceReq:

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

 sliceInfo:

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

 qosFlowUsage:

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

 servNfId:

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

 suppFeat:

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

 smfId:

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

 recoveryTime:

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

 maPduInd:

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

 atsssCapab:

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

 ipv4FrameRouteList:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4AddrMask'

 minItems: 1

 ipv6FrameRouteList:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

 minItems: 1

 satBackhaulCategory:

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

 pcfUeInfo:

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

 pvsInfo:

 type: array

 items:

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

 minItems: 1

 onboardInd:

 type: boolean

 description: >

 If it is included and set to true, it indicates that the PDU session is used for

 UE Onboarding.

 nwdafDatas:

 type: array

 items:

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

 minItems: 1

 uePolCont:

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

 required:

 - supi

 - pduSessionId

 - pduSessionType

 - dnn

 - notificationUri

 - sliceInfo

 SmPolicyDecision:

 description: Contains the SM policies authorized by the PCF.

 type: object

 properties:

 sessRules:

 type: object

 additionalProperties:

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

 minProperties: 1

 description: >

 A map of Sessionrules with the content being the SessionRule as described in

 clause 5.6.2.7. The key used in this map for each entry is the sessRuleId

 attribute of the corresponding SessionRule.

 pccRules:

 type: object

 additionalProperties:

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

 minProperties: 1

 description: >

 A map of PCC rules with the content being the PCCRule as described in

 clause 5.6.2.6. The key used in this map for each entry is the pccRuleId

 attribute of the corresponding PccRule.

 nullable: true

 pcscfRestIndication:

 type: boolean

 description: >

 If it is included and set to true, it indicates the P-CSCF Restoration is requested.

 qosDecs:

 type: object

 additionalProperties:

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

 minProperties: 1

 description: >

 Map of QoS data policy decisions. The key used in this map for each entry is the qosId

 attribute of the corresponding QosData.

 chgDecs:

 type: object

 additionalProperties:

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

 minProperties: 1

 description: >

 Map of Charging data policy decisions. The key used in this map for each entry

 is the chgId attribute of the corresponding ChargingData.

 nullable: true

 chargingInfo:

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

 traffContDecs:

 type: object

 additionalProperties:

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

 minProperties: 1

 description: >

 Map of Traffic Control data policy decisions. The key used in this map for each entry

 is the tcId attribute of the corresponding TrafficControlData.

 umDecs:

 type: object

 additionalProperties:

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

 minProperties: 1

 description: >

 Map of Usage Monitoring data policy decisions. The key used in this map for each entry

 is the umId attribute of the corresponding UsageMonitoringData.

 nullable: true

 qosChars:

 type: object

 additionalProperties:

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

 minProperties: 1

 description: >

 Map of QoS characteristics for non standard 5QIs. This map uses the 5QI values as keys.

 qosMonDecs:

 type: object

 additionalProperties:

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

 minProperties: 1

 description: >

 Map of QoS Monitoring data policy decisions. The key used in this map for each entry

 is the qmId attribute of the corresponding QosMonitoringData.

 nullable: true

 reflectiveQoSTimer:

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

 conds:

 type: object

 additionalProperties:

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

 minProperties: 1

 description: >

 A map of condition data with the content being as described in clause 5.6.2.9. The key

 used in this map for each entry is the condId attribute of the corresponding

 ConditionData.

 nullable: true

 revalidationTime:

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

 offline:

 type: boolean

 description: >

 Indicates the offline charging is applicable to the PDU session when it is included and

 set to true.

 online:

 type: boolean

 description: >

 Indicates the online charging is applicable to the PDU session when it is included and

 set to true.

 offlineChOnly:

 type: boolean

 default: false

 description: >

 Indicates that the online charging method shall never be used for any PCC rule activated

 during the lifetime of the PDU session.

 policyCtrlReqTriggers:

 type: array

 items:

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

 minItems: 1

 description: Defines the policy control request triggers subscribed by the PCF.

 nullable: true

 lastReqRuleData:

 type: array

 items:

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

 minItems: 1

 description: Defines the last list of rule control data requested by the PCF.

 lastReqUsageData:

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

 praInfos:

 type: object

 additionalProperties:

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

 minProperties: 1

 description: >

 Map of PRA information. The praId attribute within the PresenceInfo data type is the key

 of the map.

 nullable: true

 ipv4Index:

 $ref: 'TS29519\_Policy\_Data.yaml#/components/schemas/IpIndex'

 ipv6Index:

 $ref: 'TS29519\_Policy\_Data.yaml#/components/schemas/IpIndex'

 qosFlowUsage:

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

 relCause:

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

 suppFeat:

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

 tsnBridgeManCont:

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

 tsnPortManContDstt:

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

 tsnPortManContNwtts:

 type: array

 items:

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

 minItems: 1

 redSessIndication:

 type: boolean

 description: >

 Indicates whether the PDU session is a redundant PDU session. If absent it means the PDU

 session is not a redundant PDU session.

 uePolCont:

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

 SmPolicyNotification:

 description: Represents a notification on the update of the SM policies.

 type: object

 properties:

 resourceUri:

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

 smPolicyDecision:

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

 PccRule:

 description: Contains a PCC rule information.

 type: object

 properties:

 flowInfos:

 type: array

 items:

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

 minItems: 1

 description: An array of IP flow packet filter information.

 appId:

 type: string

 description: A reference to the application detection filter configured at the UPF.

 appDescriptor:

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

 contVer:

 $ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/ContentVersion'

 pccRuleId:

 type: string

 description: Univocally identifies the PCC rule within a PDU session.

 precedence:

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

 afSigProtocol:

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

 appReloc:

 type: boolean

 description: Indication of application relocation possibility.

 easRedisInd:

 type: boolean

 description: Indicates the EAS rediscovery is required.

 refQosData:

 type: array

 items:

 type: string

 minItems: 1

 maxItems: 1

 description: >

 A reference to the QosData policy decision type. It is the qosId described in

 clause 5.6.2.8.

 refAltQosParams:

 type: array

 items:

 type: string

 minItems: 1

 description: >

 A Reference to the QosData policy decision type for the Alternative QoS parameter sets

 of the service data flow.

 refTcData:

 type: array

 items:

 type: string

 minItems: 1

 maxItems: 1

 description: >

 A reference to the TrafficControlData policy decision type. It is the tcId described in

 clause 5.6.2.10.

 refChgData:

 type: array

 items:

 type: string

 minItems: 1

 maxItems: 1

 description: >

 A reference to the ChargingData policy decision type. It is the chgId described in

 clause 5.6.2.11.

 nullable: true

 refChgN3gData:

 type: array

 items:

 type: string

 minItems: 1

 maxItems: 1

 description: >

 A reference to the ChargingData policy decision type only applicable to Non-3GPP access

 if "ATSSS" feature is supported. It is the chgId described in clause 5.6.2.11.

 nullable: true

 refUmData:

 type: array

 items:

 type: string

 minItems: 1

 maxItems: 1

 description: >

 A reference to UsageMonitoringData policy decision type. It is the umId described in

 clause 5.6.2.12.

 nullable: true

 refUmN3gData:

 type: array

 items:

 type: string

 minItems: 1

 maxItems: 1

 description: >

 A reference to UsageMonitoringData policy decision type only applicable to Non-3GPP

 access if "ATSSS" feature is supported. It is the umId described in clause 5.6.2.12.

 nullable: true

 refCondData:

 type: string

 description: >

 A reference to the condition data. It is the condId described in clause 5.6.2.9.

 nullable: true

 refQosMon:

 type: array

 items:

 type: string

 minItems: 1

 maxItems: 1

 description: >

 A reference to the QosMonitoringData policy decision type. It is the qmId described in

 clause 5.6.2.40.

 nullable: true

 addrPreserInd:

 type: boolean

 nullable: true

 tscaiInputDl:

 $ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/TscaiInputContainer'

 tscaiInputUl:

 $ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/TscaiInputContainer'

 tscaiTimeDom:

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

 capBatAdaptation:

 type: boolean

 description: >

 Indicates the capability for AF to adjust the burst sending time, when it is provided

 and set to "true". The default value is "false" if omitted.

 ddNotifCtrl:

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

 ddNotifCtrl2:

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

 disUeNotif:

 type: boolean

 nullable: true

 packFiltAllPrec:

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

 nscSuppFeats:

 type: object

 additionalProperties:

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

 minProperties: 1

 description: >

 Identifies a list of Network Function Service Consumer supported per service. The key

 used in this map for each entry is the ServiceName value as defined in

 3GPP TS 29.510[29].

 required:

 - pccRuleId

 nullable: true

 SessionRule:

 description: Contains session level policy information.

 type: object

 properties:

 authSessAmbr:

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

 authDefQos:

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

 sessRuleId:

 type: string

 description: Univocally identifies the session rule within a PDU session.

 refUmData:

 type: string

 description: >

 A reference to UsageMonitoringData policy decision type. It is the umId described in

 clause 5.6.2.12.

 nullable: true

 refUmN3gData:

 type: string

 description: >

 A reference to UsageMonitoringData policy decision type to apply for Non-3GPP access. It

 is the umId described in clause 5.6.2.12.

 nullable: true

 refCondData:

 type: string

 description: >

 A reference to the condition data. It is the condId described in clause 5.6.2.9.

 nullable: true

 required:

 - sessRuleId

 nullable: true

 QosData:

 description: Contains the QoS parameters.

 type: object

 properties:

 qosId:

 type: string

 description: Univocally identifies the QoS control policy data within a PDU session.

 5qi:

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

 maxbrUl:

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

 maxbrDl:

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

 gbrUl:

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

 gbrDl:

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

 arp:

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

 qnc:

 type: boolean

 description: >

 Indicates whether notifications are requested from 3GPP NG-RAN when the GFBR can no longer

 (or again) be guaranteed for a QoS Flow during the lifetime of the QoS Flow.

 priorityLevel:

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

 averWindow:

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

 maxDataBurstVol:

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

 reflectiveQos:

 type: boolean

 description: >

 Indicates whether the QoS information is reflective for the corresponding service data

 flow.

 sharingKeyDl:

 type: string

 description: >

 Indicates, by containing the same value, what PCC rules may share resource in downlink

 direction.

 sharingKeyUl:

 type: string

 description: >

 Indicates, by containing the same value, what PCC rules may share resource in uplink

 direction.

 maxPacketLossRateDl:

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

 maxPacketLossRateUl:

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

 defQosFlowIndication:

 type: boolean

 description: >

 Indicates that the dynamic PCC rule shall always have its binding with the QoS Flow

 associated with the default QoS rule

 extMaxDataBurstVol:

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

 packetDelayBudget:

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

 packetErrorRate:

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

 required:

 - qosId

 nullable: true

 ConditionData:

 description: Contains conditions of applicability for a rule.

 type: object

 properties:

 condId:

 type: string

 description: Uniquely identifies the condition data within a PDU session.

 activationTime:

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

 deactivationTime:

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

 accessType:

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

 ratType:

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

 required:

 - condId

 nullable: true

 TrafficControlData:

 description: >

 Contains parameters determining how flows associated with a PCC Rule are treated (e.g.

 blocked, redirected, etc).

 type: object

 properties:

 tcId:

 type: string

 description: Univocally identifies the traffic control policy data within a PDU session.

 flowStatus:

 $ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/FlowStatus'

 redirectInfo:

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

 addRedirectInfo:

 type: array

 items:

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

 minItems: 1

 muteNotif:

 type: boolean

 description: Indicates whether applicat'on's start or stop notification is to be muted.

 trafficSteeringPolIdDl:

 type: string

 description: >

 Reference to a pre-configured traffic steering policy for downlink traffic at the SMF.

 nullable: true

 trafficSteeringPolIdUl:

 type: string

 description: >

 Reference to a pre-configured traffic steering policy for uplink traffic at the SMF.

 nullable: true

 metadata:

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

 routeToLocs:

 type: array

 items:

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

 minItems: 1

 description: A list of location which the traffic shall be routed to for the AF request

 nullable: true

 maxAllowedUpLat:

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

 easIpReplaceInfos:

 type: array

 items:

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

 minItems: 1

 description: Contains EAS IP replacement information.

 nullable: true

 traffCorreInd:

 type: boolean

 tfcCorreInfo:

 $ref: 'TS29522\_TrafficInfluence.yaml#/components/schemas/TrafficCorrelationInfo'

 simConnInd:

 type: boolean

 description: >

 Indicates whether simultaneous connectivity should be temporarily maintained for the

 source and target PSA.

 simConnTerm:

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

 upPathChgEvent:

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

 steerFun:

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

 steerModeDl:

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

 steerModeUl:

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

 mulAccCtrl:

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

 candDnaiInd:

 type: boolean

 description: >

 Indication of reporting candidate DNAI(s). If it is included and set to "true", the

 candidate DNAI(s) for the PDU session need to be reported. Otherwise set to "false" or

 omitted.

 required:

 - tcId

 nullable: true

 ChargingData:

 description: Contains charging related parameters.

 type: object

 properties:

 chgId:

 type: string

 description: Univocally identifies the charging control policy data within a PDU session.

 meteringMethod:

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

 offline:

 type: boolean

 description: >

 Indicates the offline charging is applicable to the PCC rule when it is included and set

 to true.

 online:

 type: boolean

 description: >

 Indicates the online charging is applicable to the PCC rule when it is included and set

 to true.

 sdfHandl:

 type: boolean

 description: >

 Indicates whether the service data flow is allowed to start while the SMF is waiting for

 the response to the credit request.

 ratingGroup:

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

 reportingLevel:

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

 serviceId:

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

 sponsorId:

 type: string

 description: Indicates the sponsor identity.

 appSvcProvId:

 type: string

 description: Indicates the application service provider identity.

 afChargingIdentifier:

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

 afChargId:

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

 required:

 - chgId

 nullable: true

 UsageMonitoringData:

 description: Contains usage monitoring related control information.

 type: object

 properties:

 umId:

 type: string

 description: Univocally identifies the usage monitoring policy data within a PDU session.

 volumeThreshold:

 $ref: 'TS29122\_CommonData.yaml#/components/schemas/VolumeRm'

 volumeThresholdUplink:

 $ref: 'TS29122\_CommonData.yaml#/components/schemas/VolumeRm'

 volumeThresholdDownlink:

 $ref: 'TS29122\_CommonData.yaml#/components/schemas/VolumeRm'

 timeThreshold:

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

 monitoringTime:

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

 nextVolThreshold:

 $ref: 'TS29122\_CommonData.yaml#/components/schemas/VolumeRm'

 nextVolThresholdUplink:

 $ref: 'TS29122\_CommonData.yaml#/components/schemas/VolumeRm'

 nextVolThresholdDownlink:

 $ref: 'TS29122\_CommonData.yaml#/components/schemas/VolumeRm'

 nextTimeThreshold:

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

 inactivityTime:

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

 exUsagePccRuleIds:

 type: array

 items:

 type: string

 minItems: 1

 description: >

 Contains the PCC rule identifier(s) which corresponding service data flow(s) shall be

 excluded from PDU Session usage monitoring. It is only included in the

 UsageMonitoringData instance for session level usage monitoring.

 nullable: true

 required:

 - umId

 nullable: true

 RedirectInformation:

 description: Contains the redirect information.

 type: object

 properties:

 redirectEnabled:

 type: boolean

 description: Indicates the redirect is enable.

 redirectAddressType:

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

 redirectServerAddress:

 type: string

 description: >

 Indicates the address of the redirect server. If "redirectAddressType" attribute

 indicates the IPV4\_ADDR, the encoding is the same as the Ipv4Addr data type defined in

 3GPP TS 29.571.If "redirectAddressType" attribute indicates the IPV6\_ADDR, the encoding

 is the same as the Ipv6Addr data type defined in 3GPP TS 29.571.If "redirectAddressType"

 attribute indicates the URL or SIP\_URI, the encoding is the same as the Uri data type

 defined in 3GPP TS 29.571.

 FlowInformation:

 description: Contains the flow information.

 type: object

 properties:

 flowDescription:

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

 ethFlowDescription:

 $ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/EthFlowDescription'

 packFiltId:

 type: string

 description: An identifier of packet filter.

 packetFilterUsage:

 type: boolean

 description: The packet shall be sent to the UE.

 tosTrafficClass:

 type: string

 description: >

 Contains the Ipv4 Type-of-Service and mask field or the Ipv6 Traffic-Class field and

 mask field.

 nullable: true

 spi:

 type: string

 description: the security parameter index of the IPSec packet.

 nullable: true

 flowLabel:

 type: string

 description: the Ipv6 flow label header field.

 nullable: true

 flowDirection:

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

 SmPolicyDeleteData:

 description: >

 Contains the parameters to be sent to the PCF when an individual SM policy is deleted.

 type: object

 properties:

 userLocationInfo:

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

 ueTimeZone:

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

 servingNetwork:

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

 userLocationInfoTime:

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

 ranNasRelCauses:

 type: array

 items:

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

 minItems: 1

 description: Contains the RAN and/or NAS release cause.

 accuUsageReports:

 type: array

 items:

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

 minItems: 1

 description: Contains the usage report

 pduSessRelCause:

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

 qosMonReports:

 type: array

 items:

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

 minItems: 1

 QosCharacteristics:

 description: Contains QoS characteristics for a non-standardized or a non-configured 5QI.

 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'

 averagingWindow:

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

 maxDataBurstVol:

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

 extMaxDataBurstVol:

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

 required:

 - 5qi

 - resourceType

 - priorityLevel

 - packetDelayBudget

 - packetErrorRate

 ChargingInformation:

 description: Contains the addresses of the charging functions.

 type: object

 properties:

 primaryChfAddress:

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

 secondaryChfAddress:

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

 primaryChfSetId:

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

 primaryChfInstanceId:

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

 secondaryChfSetId:

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

 secondaryChfInstanceId:

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

 required:

 - primaryChfAddress

 AccuUsageReport:

 description: Contains the accumulated usage report information.

 type: object

 properties:

 refUmIds:

 type: string

 description: >

 An id referencing UsageMonitoringData objects associated with this usage report.

 volUsage:

 $ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

 volUsageUplink:

 $ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

 volUsageDownlink:

 $ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

 timeUsage:

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

 nextVolUsage:

 $ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

 nextVolUsageUplink:

 $ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

 nextVolUsageDownlink:

 $ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

 nextTimeUsage:

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

 required:

 - refUmIds

 SmPolicyUpdateContextData:

 description: >

 Contains the policy control request trigger(s) that were met and the corresponding new

 value(s) or the error report of the policy enforcement.

 type: object

 properties:

 repPolicyCtrlReqTriggers:

 type: array

 items:

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

 minItems: 1

 description: The policy control reqeust trigges which are met.

 accNetChIds:

 type: array

 items:

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

 minItems: 1

 description: >

 Indicates the access network charging identifier for the PCC rule(s) or whole PDU

 session.

 accessType:

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

 ratType:

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

 addAccessInfo:

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

 relAccessInfo:

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

 servingNetwork:

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

 userLocationInfo:

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

 ueTimeZone:

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

 relIpv4Address:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

 ipv4Address:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

 ipDomain:

 type: string

 description: Indicates the IPv4 address domain

 ipv6AddressPrefix:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

 relIpv6AddressPrefix:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

 addIpv6AddrPrefixes:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

 addRelIpv6AddrPrefixes:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

 multiIpv6Prefixes:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

 minItems: 1

 description: The multiple allocated IPv6 prefixes of the served UE.

 multiRelIpv6Prefixes:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

 minItems: 1

 description: The multiple released IPv6 prefixes of the served UE.

 relUeMac:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/MacAddr48'

 ueMac:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/MacAddr48'

 subsSessAmbr:

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

 authProfIndex:

 type: string

 description: Indicates the DN-AAA authorization profile index

 subsDefQos:

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

 vplmnQos:

 $ref: 'TS29502\_Nsmf\_PDUSession.yaml#/components/schemas/VplmnQos'

 vplmnQosNotApp:

 type: boolean

 description: >

 If it is included and set to true, indicates that the QoS constraints in the VPLMN are

 not applicable.

 numOfPackFilter:

 type: integer

 description: Contains the number of supported packet filter for signalled QoS rules.

 accuUsageReports:

 type: array

 items:

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

 minItems: 1

 description: Contains the usage report

 3gppPsDataOffStatus:

 type: boolean

 description: >

 If it is included and set to true, the 3GPP PS Data Off is activated by the UE.

 appDetectionInfos:

 type: array

 items:

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

 minItems: 1

 description: >

 Report the start/stop of the application traffic and detected SDF descriptions

 if applicable.

 ruleReports:

 type: array

 items:

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

 minItems: 1

 description: Used to report the PCC rule failure.

 sessRuleReports:

 type: array

 items:

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

 minItems: 1

 description: Used to report the session rule failure.

 qncReports:

 type: array

 items:

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

 minItems: 1

 description: QoS Notification Control information.

 qosMonReports:

 type: array

 items:

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

 minItems: 1

 userLocationInfoTime:

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

 repPraInfos:

 type: object

 additionalProperties:

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

 minProperties: 1

 description: >

 Reports the changes of presence reporting area. The praId attribute within the

 PresenceInfo data type is the key of the map.

 ueInitResReq:

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

 refQosIndication:

 type: boolean

 description: >

 If it is included and set to true, the reflective QoS is supported by the UE. If it is

 included and set to false, the reflective QoS is revoked by the UE.

 qosFlowUsage:

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

 creditManageStatus:

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

 servNfId:

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

 traceReq:

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

 maPduInd:

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

 atsssCapab:

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

 tsnBridgeInfo:

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

 tsnBridgeManCont:

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

 tsnPortManContDstt:

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

 tsnPortManContNwtts:

 type: array

 items:

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

 minItems: 1

 mulAddrInfos:

 type: array

 items:

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

 minItems: 1

 policyDecFailureReports:

 type: array

 items:

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

 minItems: 1

 description: Contains the type(s) of failed policy decision and/or condition data.

 invalidPolicyDecs:

 type: array

 items:

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

 minItems: 1

 description: >

 Indicates the invalid parameters for the reported type(s) of the failed policy decision

 and/or condition data.

 trafficDescriptors:

 type: array

 items:

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

 minItems: 1

 pccRuleId:

 type: string

 description: >

 Contains the identifier of the PCC rule which is used for traffic detection of event.

 typesOfNotif:

 type: array

 items:

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

 minItems: 1

 interGrpIds:

 type: array

 items:

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

 minItems: 1

 satBackhaulCategory:

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

 pcfUeInfo:

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

 nwdafDatas:

 type: array

 items:

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

 minItems: 1

 nullable: true

 anGwStatus:

 type: boolean

 description: >

 When it is included and set to true, it indicates that the AN-Gateway has failed and

 that the PCF should refrain from sending policy decisions to the SMF until it is

 informed that the AN-Gateway has been recovered.

 uePolCont:

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

 allOf:

 - not:

 required: [multiIpv6Prefixes, ipv6AddressPrefix]

 - not:

 required: [multiIpv6Prefixes, addIpv6AddrPrefixes]

 - not:

 required: [multiRelIpv6Prefixes, relIpv6AddressPrefix]

 - not:

 required: [multiRelIpv6Prefixes, relAddIpv6AddrPrefixes]

 UpPathChgEvent:

 description: Contains the UP path change event subscription from the AF.

 type: object

 properties:

 notificationUri:

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

 notifCorreId:

 type: string

 description: >

 It is used to set the value of Notification Correlation ID in the notification sent by

 the SMF.

 dnaiChgType:

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

 afAckInd:

 type: boolean

 required:

 - notificationUri

 - notifCorreId

 - dnaiChgType

 nullable: true

 TerminationNotification:

 description: Represents a Termination Notification.

 type: object

 properties:

 resourceUri:

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

 cause:

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

 required:

 - resourceUri

 - cause

 AppDetectionInfo:

 description: Contains the detected application's traffic information.

 type: object

 properties:

 appId:

 type: string

 description: A reference to the application detection filter configured at the UPF

 instanceId:

 type: string

 description: >

 Identifier sent by the SMF in order to allow correlation of application Start and Stop

 events to the specific service data flow description, if service data flow descriptions

 are deducible.

 sdfDescriptions:

 type: array

 items:

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

 minItems: 1

 description: Contains the detected service data flow descriptions if they are deducible.

 required:

 - appId

 AccNetChId:

 description: >

 Contains the access network charging identifier for the PCC rule(s) or for the whole

 PDU session.

 type: object

 properties:

 accNetChaIdValue:

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

 accNetChargId:

 type: string

 description: A character string containing the access network charging id.

 refPccRuleIds:

 type: array

 items:

 type: string

 minItems: 1

 description: >

 Contains the identifier of the PCC rule(s) associated to the provided Access Network

 Charging Identifier.

 sessionChScope:

 type: boolean

 description: >

 When it is included and set to true, indicates the Access Network Charging Identifier

 applies to the whole PDU Session

 oneOf:

 - required: [accNetChaIdValue]

 - required: [accNetChargId]

 AccNetChargingAddress:

 description: Describes the network entity within the access network performing charging

 type: object

 anyOf:

 - required: [anChargIpv4Addr]

 - required: [anChargIpv6Addr]

 properties:

 anChargIpv4Addr:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

 anChargIpv6Addr:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

 RequestedRuleData:

 description: >

 Contains rule data requested by the PCF to receive information associated with PCC rule(s).

 type: object

 properties:

 refPccRuleIds:

 type: array

 items:

 type: string

 minItems: 1

 description: >

 An array of PCC rule id references to the PCC rules associated with the control data.

 reqData:

 type: array

 items:

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

 minItems: 1

 description: >

 Array of requested rule data type elements indicating what type of rule data is

 requested for the corresponding referenced PCC rules.

 required:

 - refPccRuleIds

 - reqData

 RequestedUsageData:

 description: >

 Contains usage data requested by the PCF requesting usage reports for the corresponding

 usage monitoring data instances.

 type: object

 properties:

 refUmIds:

 type: array

 items:

 type: string

 minItems: 1

 description: >

 An array of usage monitoring data id references to the usage monitoring data instances

 for which the PCF is requesting a usage report. This attribute shall only be provided

 when allUmIds is not set to true.

 allUmIds:

 type: boolean

 description: >

 This boolean indicates whether requested usage data applies to all usage monitoring data

 instances. When it's not included, it means requested usage data shall only apply to the

 usage monitoring data instances referenced by the refUmIds attribute.

 UeCampingRep:

 description: >

 Contains the current applicable values corresponding to the policy control request triggers.

 type: object

 properties:

 accessType:

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

 ratType:

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

 servNfId:

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

 servingNetwork:

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

 userLocationInfo:

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

 ueTimeZone:

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

 netLocAccSupp:

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

 satBackhaulCategory:

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

 RuleReport:

 description: Reports the status of PCC.

 type: object

 properties:

 pccRuleIds:

 type: array

 items:

 type: string

 minItems: 1

 description: Contains the identifier of the affected PCC rule(s).

 ruleStatus:

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

 contVers:

 type: array

 items:

 $ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/ContentVersion'

 minItems: 1

 description: Indicates the version of a PCC rule.

 failureCode:

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

 retryAfter:

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

 finUnitAct:

 $ref: 'TS32291\_Nchf\_ConvergedCharging.yaml#/components/schemas/FinalUnitAction'

 ranNasRelCauses:

 type: array

 items:

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

 minItems: 1

 description: indicates the RAN or NAS release cause code information.

 altQosParamId:

 type: string

 description: >

 Indicates the alternative QoS parameter set that the NG-RAN can guarantee. It is

 included during the report of successfull resource allocation and indicates that NG-RAN

 used an alternative QoS profile because the requested QoS could not be allocated..

 required:

 - pccRuleIds

 - ruleStatus

 RanNasRelCause:

 description: Contains the RAN/NAS release cause.

 type: object

 properties:

 ngApCause:

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

 5gMmCause:

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

 5gSmCause:

 $ref: '#/components/schemas/5GSmCause'

 epsCause:

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

 UeInitiatedResourceRequest:

 description: Indicates that a UE requests specific QoS handling for the selected SDF.

 type: object

 properties:

 pccRuleId:

 type: string

 ruleOp:

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

 precedence:

 type: integer

 packFiltInfo:

 type: array

 items:

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

 minItems: 1

 reqQos:

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

 required:

 - ruleOp

 - packFiltInfo

 PacketFilterInfo:

 description: >

 Contains the information from a single packet filter sent from the SMF to the PCF.

 type: object

 properties:

 packFiltId:

 type: string

 description: An identifier of packet filter.

 packFiltCont:

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

 tosTrafficClass:

 type: string

 description: >

 Contains the Ipv4 Type-of-Service and mask field or the Ipv6 Traffic-Class field and

 mask field.

 spi:

 type: string

 description: The security parameter index of the IPSec packet.

 flowLabel:

 type: string

 description: The Ipv6 flow label header field.

 flowDirection:

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

 RequestedQos:

 description: Contains the QoS information requested by the UE.

 type: object

 properties:

 5qi:

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

 gbrUl:

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

 gbrDl:

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

 required:

 - 5qi

 QosNotificationControlInfo:

 description: Contains the QoS Notification Control Information.

 type: object

 properties:

 refPccRuleIds:

 type: array

 items:

 type: string

 minItems: 1

 description: >

 An array of PCC rule id references to the PCC rules associated with the QoS notification

 control info.

 notifType:

 $ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/QosNotifType'

 contVer:

 $ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/ContentVersion'

 altQosParamId:

 type: string

 description: >

 Indicates the alternative QoS parameter set the NG-RAN can guarantee. When it is omitted

 and the notifType attribute is set to NOT\_GUAARANTEED it indicates that the lowest

 priority alternative QoS profile could not be fulfilled.

 altQosNotSuppInd:

 type: boolean

 description: >

 When present and set to true it indicates that the Alternative QoS profiles are not

 supported by NG-RAN.

 required:

 - refPccRuleIds

 - notifType

 PartialSuccessReport:

 description: >

 Includes the information reported by the SMF when some of the PCC rules and/or session rules

 and/or policy decision and/or condition data are not successfully installed/activated or

 stored.

 type: object

 properties:

 failureCause:

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

 ruleReports:

 type: array

 items:

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

 minItems: 1

 description: >

 Information about the PCC rules provisioned by the PCF not successfully

 installed/activated.

 sessRuleReports:

 type: array

 items:

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

 minItems: 1

 description: >

 Information about the session rules provisioned by the PCF not successfully installed.

 ueCampingRep:

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

 policyDecFailureReports:

 type: array

 items:

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

 minItems: 1

 description: Contains the type(s) of failed policy decision and/or condition data.

 invalidPolicyDecs:

 type: array

 items:

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

 minItems: 1

 description: >

 Indicates the invalid parameters for the reported type(s) of the failed policy decision

 and/or condition data.

 required:

 - failureCause

 AuthorizedDefaultQos:

 description: Represents the Authorized Default QoS.

 type: object

 properties:

 5qi:

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

 arp:

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

 priorityLevel:

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

 averWindow:

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

 maxDataBurstVol:

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

 maxbrUl:

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

 maxbrDl:

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

 gbrUl:

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

 gbrDl:

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

 extMaxDataBurstVol:

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

 ErrorReport:

 description: Contains the rule,policy decision and/or condition data error reports.

 type: object

 properties:

 error:

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

 ruleReports:

 type: array

 items:

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

 minItems: 1

 description: Used to report the PCC rule failure.

 sessRuleReports:

 type: array

 items:

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

 minItems: 1

 description: Used to report the session rule failure.

 polDecFailureReports:

 type: array

 items:

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

 minItems: 1

 description: Used to report failure of the policy decision and/or condition data.

 invalidPolicyDecs:

 type: array

 items:

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

 minItems: 1

 description: >

 Indicates the invalid parameters for the reported type(s) of the failed policy decision

 and/or condition data.

 SessionRuleReport:

 description: Represents reporting of the status of a session rule.

 type: object

 properties:

 ruleIds:

 type: array

 items:

 type: string

 minItems: 1

 description: Contains the identifier of the affected session rule(s).

 ruleStatus:

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

 sessRuleFailureCode:

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

 policyDecFailureReports:

 type: array

 items:

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

 minItems: 1

 description: Contains the type(s) of failed policy decision and/or condition data.

 required:

 - ruleIds

 - ruleStatus

 ServingNfIdentity:

 description: Contains the serving Network Function identity.

 type: object

 properties:

 servNfInstId:

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

 guami:

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

 anGwAddr:

 $ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/AnGwAddress'

 sgsnAddr:

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

 SteeringMode:

 description: Contains the steering mode value and parameters determined by the PCF.

 type: object

 properties:

 steerModeValue:

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

 active:

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

 standby:

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

 3gLoad:

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

 prioAcc:

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

 thresValue:

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

 steerModeInd:

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

 required:

 - steerModeValue

 AdditionalAccessInfo:

 description: >

 Indicates the combination of additional Access Type and RAT Type for a MA PDU session.

 type: object

 properties:

 accessType:

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

 ratType:

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

 required:

 - accessType

 QosMonitoringData:

 description: Contains QoS monitoring related control information.

 type: object

 properties:

 qmId:

 type: string

 description: Univocally identifies the QoS monitoring policy data within a PDU session.

 reqQosMonParams:

 type: array

 items:

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

 minItems: 1

 description: >

 indicates the QoS information to be monitored when the QoS Monitoring is enabled for

 the service data flow.

 repFreqs:

 type: array

 items:

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

 minItems: 1

 repThreshDl:

 type: integer

 description: Indicates the period of time in units of miliiseconds for DL packet delay.

 nullable: true

 repThreshUl:

 type: integer

 description: Indicates the period of time in units of miliiseconds for UL packet delay.

 nullable: true

 repThreshRp:

 type: integer

 description: >

 Indicates the period of time in units of miliiseconds for round trip packet delay.

 nullable: true

 waitTime:

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

 repPeriod:

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

 notifyUri:

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

 notifyCorreId:

 type: string

 nullable: true

 directNotifInd:

 type: boolean

 description: >

 Indicates that the direct event notification sent by UPF to the Local NEF or AF is

 requested if it is included and set to true.

 required:

 - qmId

 - reqQosMonParams

 - repFreqs

 nullable: true

 QosMonitoringReport:

 description: Contains reporting information on QoS monitoring.

 type: object

 properties:

 refPccRuleIds:

 type: array

 items:

 type: string

 minItems: 1

 description: >

 An array of PCC rule id references to the PCC rules associated with the QoS monitoring

 report.

 ulDelays:

 type: array

 items:

 type: integer

 minItems: 1

 dlDelays:

 type: array

 items:

 type: integer

 minItems: 1

 rtDelays:

 type: array

 items:

 type: integer

 minItems: 1

 pdmf:

 type: boolean

 description: Represents the packet delay measurement failure indicator.

 required:

 - refPccRuleIds

#

 TsnBridgeInfo:

 description: Contains parameters that describe and identify the TSC user plane node.

 type: object

 properties:

 bridgeId:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

 dsttAddr:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/MacAddr48'

 dsttPortNum:

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

 dsttResidTime:

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

 mtuIpv4:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint16'

 mtuIpv6:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'

#

 PortManagementContainer:

 description: Contains the port management information container for a port.

 type: object

 properties:

 portManCont:

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

 portNum:

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

 required:

 - portManCont

 - portNum

 BridgeManagementContainer:

 description: Contains the UMIC.

 type: object

 properties:

 bridgeManCont:

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

 required:

 - bridgeManCont

 IpMulticastAddressInfo:

 description: Contains the IP multicast addressing information.

 type: object

 properties:

 srcIpv4Addr:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

 ipv4MulAddr:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

 srcIpv6Addr:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

 ipv6MulAddr:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

 DownlinkDataNotificationControl:

 description: Contains the downlink data notification control information.

 type: object

 properties:

 notifCtrlInds:

 type: array

 items:

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

 minItems: 1

 typesOfNotif:

 type: array

 items:

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

 minItems: 1

 DownlinkDataNotificationControlRm:

 description: >

 This data type is defined in the same way as the DownlinkDataNotificationControl data type,

 but with the nullable:true property.

 type: object

 properties:

 notifCtrlInds:

 type: array

 items:

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

 minItems: 1

 nullable: true

 typesOfNotif:

 type: array

 items:

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

 minItems: 1

 nullable: true

 nullable: true

 ThresholdValue:

 description: Indicates the threshold value(s) for RTT and/or Packet Loss Rate.

 type: object

 properties:

 rttThres:

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

 plrThres:

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

 nullable: true

 NwdafData:

 description: >

 Indicates the list of Analytic ID(s) per NWDAF instance ID used for the PDU Session consumed

 by the SMF.

 type: object

 properties:

 nwdafInstanceId:

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

 nwdafEvents:

 type: array

 items:

 $ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/NwdafEvent'

 minItems: 1

 required:

 - nwdafInstanceId

 5GSmCause:

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

 EpsRanNasRelCause:

 type: string

 description: Defines the EPS RAN/NAS release cause.

 PacketFilterContent:

 type: string

 description: Defines a packet filter for an IP flow.

 FlowDescription:

 type: string

 description: Defines a packet filter for an IP flow.

 TsnPortNumber:

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

 ApplicationDescriptor:

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

 UePolicyContainer:

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

 FlowDirection:

 anyOf:

 - type: string

 enum:

 - DOWNLINK

 - UPLINK

 - BIDIRECTIONAL

 - UNSPECIFIED

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration and is not used to encode

 content defined in the present version of this API.

 description: |

 Indicates the direction of the service data flow.

 Possible values are:

 - DOWNLINK: The corresponding filter applies for traffic to the UE.

 - UPLINK: The corresponding filter applies for traffic from the UE.

 - BIDIRECTIONAL: The corresponding filter applies for traffic both to and from the UE.

 - UNSPECIFIED: The corresponding filter applies for traffic to the UE (downlink), but has no

 specific direction declared. The service data flow detection shall apply the filter for

 uplink traffic as if the filter was bidirectional. The PCF shall not use the value

 UNSPECIFIED in filters created by the network in NW-initiated procedures. The PCF shall only

 include the value UNSPECIFIED in filters in UE-initiated procedures if the same value is

 received from the SMF.

 FlowDirectionRm:

 description: >

 This data type is defined in the same way as the "FlowDirection" data type, with the only

 difference that it allows null value.

 anyOf:

 - $ref: '#/components/schemas/FlowDirection'

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

 ReportingLevel:

 anyOf:

 - type: string

 enum:

 - SER\_ID\_LEVEL

 - RAT\_GR\_LEVEL

 - SPON\_CON\_LEVEL

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

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration and is not used to encode

 content defined in the present version of this API.

 description: |

 Indicates the reporting level.

 Possible values are:

 - SER\_ID\_LEVEL: Indicates that the usage shall be reported on service id and rating group

 combination level.

 - RAT\_GR\_LEVEL: Indicates that the usage shall be reported on rating group level.

 - SPON\_CON\_LEVEL: Indicates that the usage shall be reported on sponsor identity and rating

 group combination level.

 MeteringMethod:

 anyOf:

 - type: string

 enum:

 - DURATION

 - VOLUME

 - DURATION\_VOLUME

 - EVENT

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

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration and is not used to encode

 content defined in the present version of this API.

 description: |

 Indicates the metering method.

 Possible values are:

 - DURATION: Indicates that the duration of the service data flow traffic shall be metered.

 - VOLUME: Indicates that volume of the service data flow traffic shall be metered.

 - DURATION\_VOLUME: Indicates that the duration and the volume of the service data flow

 traffic shall be metered.

 - EVENT: Indicates that events of the service data flow traffic shall be metered.

 PolicyControlRequestTrigger:

 anyOf:

 - type: string

 enum:

 - PLMN\_CH

 - RES\_MO\_RE

 - AC\_TY\_CH

 - UE\_IP\_CH

 - UE\_MAC\_CH

 - AN\_CH\_COR

 - US\_RE

 - APP\_STA

 - APP\_STO

 - AN\_INFO

 - CM\_SES\_FAIL

 - PS\_DA\_OFF

 - DEF\_QOS\_CH

 - SE\_AMBR\_CH

 - QOS\_NOTIF

 - NO\_CREDIT

 - REALLO\_OF\_CREDIT

 - PRA\_CH

 - SAREA\_CH

 - SCNN\_CH

 - RE\_TIMEOUT

 - RES\_RELEASE

 - SUCC\_RES\_ALLO

 - RAI\_CH

 - RAT\_TY\_CH

 - REF\_QOS\_IND\_CH

 - NUM\_OF\_PACKET\_FILTER

 - UE\_STATUS\_RESUME

 - UE\_TZ\_CH

 - AUTH\_PROF\_CH

 - QOS\_MONITORING

 - SCELL\_CH

 - USER\_LOCATION\_CH

 - EPS\_FALLBACK

 - MA\_PDU

 - TSN\_BRIDGE\_INFO

 - 5G\_RG\_JOIN

 - 5G\_RG\_LEAVE

 - DDN\_FAILURE

 - DDN\_DELIVERY\_STATUS

 - GROUP\_ID\_LIST\_CHG

 - DDN\_FAILURE\_CANCELLATION

 - DDN\_DELIVERY\_STATUS\_CANCELLATION

 - VPLMN\_QOS\_CH

 - SUCC\_QOS\_UPDATE

 - SAT\_CATEGORY\_CHG

 - PCF\_UE\_NOTIF\_IND

 - NWDAF\_DATA\_CHG

 - UE\_POL\_CONT\_IND

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration and is not used to encode

 content defined in the present version of this API.

 description: |

 Indicates the policy control request trigger(s).

 Possible values are:

 - PLMN\_CH: PLMN Change

 - RES\_MO\_RE: A request for resource modification has been received by the SMF. The SMF

 always reports to the PCF.

 - AC\_TY\_CH: Access Type Change.

 - UE\_IP\_CH: UE IP address change. The SMF always reports to the PCF.

 - UE\_MAC\_CH: A new UE MAC address is detected or a used UE MAC address is inactive for a

 specific period.

 - AN\_CH\_COR: Access Network Charging Correlation Information

 - US\_RE: The PDU Session or the Monitoring key specific resources consumed by a UE either

 reached the threshold or needs to be reported for other reasons.

 - APP\_STA: The start of application traffic has been detected.

 - APP\_STO: The stop of application traffic has been detected.

 - AN\_INFO: Access Network Information report.

 - CM\_SES\_FAIL: Credit management session failure.

 - PS\_DA\_OFF: The SMF reports when the 3GPP PS Data Off status changes. The SMF always

 reports to the PCF.

 - DEF\_QOS\_CH: Default QoS Change. The SMF always reports to the PCF.

 - SE\_AMBR\_CH: Session-AMBR Change. The SMF always reports to the PCF.

 - QOS\_NOTIF: The SMF notify the PCF when receiving notification from RAN that QoS targets of

 the QoS Flow cannot be guranteed or gurateed again.

 - NO\_CREDIT: Out of credit.

 - REALLO\_OF\_CREDIT: Reallocation of credit.

 - PRA\_CH: Change of UE presence in Presence Reporting Area.

 - SAREA\_CH: Location Change with respect to the Serving Area.

 - SCNN\_CH: Location Change with respect to the Serving CN node.

 - RE\_TIMEOUT: Indicates the SMF generated the request because there has been a PCC

 revalidation timeout.

 - RES\_RELEASE: Indicate that the SMF can inform the PCF of the outcome of the release of

 resources for those rules that require so.

 - SUCC\_RES\_ALLO: Indicates that the requested rule data is the successful resource

 allocation.

 - RAI\_CH: Location Change with respect to the RAI of GERAN and UTRAN.

 - RAT\_TY\_CH: RAT Type Change.

 - REF\_QOS\_IND\_CH: Reflective QoS indication Change

 - NUM\_OF\_PACKET\_FILTER: Indicates that the SMF shall report the number of supported packet

 filter for signalled QoS rules.

 - UE\_STATUS\_RESUME: Indicates that the UE's status is resumed.

 - UE\_TZ\_CH: UE Time Zone Change.

 - AUTH\_PROF\_CH: The DN-AAA authorization profile index has changed.

 - QOS\_MONITORING: Indicate that the SMF notifies the PCF of the QoS Monitoring information.

 - SCELL\_CH: Location Change with respect to the Serving Cell.

 - USER\_LOCATION\_CH: Indicate that user location has been changed, applicable to serving area

 change and serving cell change.

 - EPS\_FALLBACK: EPS Fallback report is enabled in the SMF.

 - MA\_PDU: UE Indicates that the SMF notifies the PCF of the MA PDU session request.

 - TSN\_BRIDGE\_INFO: TSC user plane node information available.

 - 5G\_RG\_JOIN: The 5G-RG has joined to an IP Multicast Group.

 - 5G\_RG\_LEAVE: The 5G-RG has left an IP Multicast Group.

 - DDN\_FAILURE: Event subscription for DDN Failure event received.

 - DDN\_DELIVERY\_STATUS: Event subscription for DDN Delivery Status received.

 - GROUP\_ID\_LIST\_CHG: UE Internal Group Identifier(s) has changed: the SMF reports that UDM

 provided list of group Ids has changed.

 - DDN\_FAILURE\_CANCELLATION: The event subscription for DDN Failure event is cancelled.

 - DDN\_DELIVERY\_STATUS\_CANCELLATION: The event subscription for DDD STATUS is cancelled.

 - VPLMN\_QOS\_CH: Change of the QoS supported in the VPLMN.

 - SUCC\_QOS\_UPDATE: Indicates that the requested MPS Action is successful.

 - SAT\_CATEGORY\_CHG: Indicates that the SMF has detected a change between different satellite

 backhaul categories, or between a satellite backhaul and a non-satellite backhaul.

 - PCF\_UE\_NOTIF\_IND: Indicates the SMF has detected the AMF forwarded the PCF for the UE

 indication to receive/stop receiving notifications of SM Policy association

 established/terminated events.

 - NWDAF\_DATA\_CHG: Indicates that the NWDAF instance IDs used for the PDU session and/or

 associated Analytics IDs used for the PDU session and available in the SMF have changed.

 - UE\_POL\_CONT\_IND: Indicates that a new UE policy container is available.

 RequestedRuleDataType:

 anyOf:

 - type: string

 enum:

 - CH\_ID

 - MS\_TIME\_ZONE

 - USER\_LOC\_INFO

 - RES\_RELEASE

 - SUCC\_RES\_ALLO

 - EPS\_FALLBACK

 - type: string

 description: >

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 content defined in the present version of this API.

 description: |

 Indicates the type of rule data requested by the PCF.

 Possible values are:

 - CH\_ID: Indicates that the requested rule data is the charging identifier.

 - MS\_TIME\_ZONE: Indicates that the requested access network info type is the UE's timezone.

 - USER\_LOC\_INFO: Indicates that the requested access network info type is the UE's location.

 - RES\_RELEASE: Indicates that the requested rule data is the result of the release of

 resource.

 - SUCC\_RES\_ALLO: Indicates that the requested rule data is the successful resource

 allocation.

 - EPS\_FALLBACK: Indicates that the requested rule data is the report of QoS flow rejection

 due to EPS fallback.

 RuleStatus:

 anyOf:

 - type: string

 enum:

 - ACTIVE

 - INACTIVE

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration and is not used to encode

 content defined in the present version of this API.

 description: |

 Indicates the status of PCC or session rule.

 Possible values are

 - ACTIVE: Indicates that the PCC rule(s) are successfully installed (for those provisioned

 from PCF) or activated (for those pre-defined in SMF), or the session rule(s) are

 successfully installed

 - INACTIVE: Indicates that the PCC rule(s) are removed (for those provisioned from PCF) or

 inactive (for those pre-defined in SMF) or the session rule(s) are removed.

 FailureCode:

 anyOf:

 - type: string

 enum:

 - UNK\_RULE\_ID

 - RA\_GR\_ERR

 - SER\_ID\_ERR

 - NF\_MAL

 - RES\_LIM

 - MAX\_NR\_QoS\_FLOW

 - MISS\_FLOW\_INFO

 - RES\_ALLO\_FAIL

 - UNSUCC\_QOS\_VAL

 - INCOR\_FLOW\_INFO

 - PS\_TO\_CS\_HAN

 - APP\_ID\_ERR

 - NO\_QOS\_FLOW\_BOUND

 - FILTER\_RES

 - MISS\_REDI\_SER\_ADDR

 - CM\_END\_USER\_SER\_DENIED

 - CM\_CREDIT\_CON\_NOT\_APP

 - CM\_AUTH\_REJ

 - CM\_USER\_UNK

 - CM\_RAT\_FAILED

 - UE\_STA\_SUSP

 - UNKNOWN\_REF\_ID

 - INCORRECT\_COND\_DATA

 - REF\_ID\_COLLISION

 - TRAFFIC\_STEERING\_ERROR

 - DNAI\_STEERING\_ERROR

 - AN\_GW\_FAILE

 - MAX\_NR\_PACKET\_FILTERS\_EXCEEDED

 - PACKET\_FILTER\_TFT\_ALLOCATION\_EXCEEDED

 - MUTE\_CHG\_NOT\_ALLOWED

 - UE\_TEMPORARILY\_UNAVAILABLE

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration and is not used to encode

 content defined in the present version of this API.

 description: |

 Indicates the reason of the PCC rule failure.

 Possible values are

 - UNK\_RULE\_ID: Indicates that the pre-provisioned PCC rule could not be successfully

 activated because the PCC rule identifier is unknown to the SMF.

 - RA\_GR\_ERR: Indicate that the PCC rule could not be successfully installed or enforced

 because the Rating Group specified within the Charging Data policy decision which the PCC

 rule refers to is unknown or, invalid.

 - SER\_ID\_ERR: Indicate that the PCC rule could not be successfully installed or enforced

 because the Service Identifier specified within the Charging Data policy decision which the

 PCC rule refers to is invalid, unknown, or not applicable to the service being charged.

 - NF\_MAL: Indicate that the PCC rule could not be successfully installed (for those

 provisioned from the PCF) or activated (for those pre-defined in SMF) or enforced (for those

 already successfully installed) due to SMF/UPF malfunction.

 - RES\_LIM: Indicate that the PCC rule could not be successfully installed (for those

 provisioned from PCF) or activated (for those pre-defined in SMF) or enforced (for those

 already successfully installed) due to a limitation of resources at the SMF/UPF.

 - MAX\_NR\_QoS\_FLOW: Indicate that the PCC rule could not be successfully installed (for those

 provisioned from PCF) or activated (for those pre-defined in SMF) or enforced (for those

 already successfully installed) due to the fact that the maximum number of QoS flows has

 been reached for the PDU session.

 - MISS\_FLOW\_INFO: Indicate that the PCC rule could not be successfully installed or enforced

 because neither the "flowInfos" attribute nor the "appId" attribute is specified within the

 PccRule data structure by the PCF during the first install request of the PCC rule.

 - RES\_ALLO\_FAIL: Indicate that the PCC rule could not be successfully installed or

 maintained since the QoS flow establishment/modification failed, or the QoS flow was

 released.

 - UNSUCC\_QOS\_VAL: indicate that the QoS validation has failed or when Guaranteed Bandwidth >

 Max-Requested-Bandwidth.

 - INCOR\_FLOW\_INFO: Indicate that the PCC rule could not be successfully installed or

 modified at the SMF because the provided flow information is not supported by the network

 (e.g. the provided IP address(es) or Ipv6 prefix(es) do not correspond to an IP version

 applicable for the PDU session).

 - PS\_TO\_CS\_HAN: Indicate that the PCC rule could not be maintained because of PS to CS

 handover.

 - APP\_ID\_ERR: Indicate that the rule could not be successfully installed or enforced because

 the Application Identifier is invalid, unknown, or not applicable to the application

 required for detection.

 - NO\_QOS\_FLOW\_BOUND: Indicate that there is no QoS flow which the SMF can bind the PCC

 rule(s) to.

 - FILTER\_RES: Indicate that the Flow Information within the "flowInfos" attribute cannot be

 handled by the SMF because any of the restrictions defined in clause 5.4.2 of 3GPP TS 29.212

 was not met.

 - MISS\_REDI\_SER\_ADDR: Indicate that the PCC rule could not be successfully installed or

 enforced at the SMF because there is no valid Redirect Server Address within the Traffic

 Control Data policy decision which the PCC rule refers to provided by the PCF and no

 preconfigured redirection address for this PCC rule at the SMF.

 - CM\_END\_USER\_SER\_DENIED: Indicate that the charging system denied the service request due

 to service restrictions (e.g. terminate rating group) or limitations related to the

 end-user, for example the end-user's account could not cover the requested service.

 - CM\_CREDIT\_CON\_NOT\_APP: Indicate that the charging system determined that the service can

 be granted to the end user but no further credit control is needed for the service (e.g.

 service is free of charge or is treated for offline charging).

 - CM\_AUTH\_REJ: Indicate that the charging system denied the service request in order to

 terminate the service for which credit is requested.

 - CM\_USER\_UNK: Indicate that the specified end user could not be found in the charging

 system.

 - CM\_RAT\_FAILED: Indicate that the charging system cannot rate the service request due to

 insufficient rating input, incorrect AVP combination or due to an attribute or an attribute

 value that is not recognized or supported in the rating.

 - UE\_STA\_SUSP: Indicates that the UE is in suspend state.

 - UNKNOWN\_REF\_ID: Indicates that the PCC rule could not be successfully installed/modified

 because the referenced identifier to a Policy Decision Data or to a Condition Data is

 unknown to the SMF.

 - INCORRECT\_COND\_DATA: Indicates that the PCC rule could not be successfully

 installed/modified because the referenced Condition data are incorrect.

 - REF\_ID\_COLLISION: Indicates that PCC rule could not be successfully installed/modified

 because the same Policy Decision is referenced by a session rule (e.g. the session rule and the PCC rule refer to the same Usage Monitoring decision data).

 - TRAFFIC\_STEERING\_ERROR: Indicates that enforcement of the steering of traffic to the

 N6-LAN or 5G-LAN failed; or the dynamic PCC rule could not be successfully installed or

 modified at the NF service consumer because there are invalid traffic steering policy

 identifier(s) within the provided Traffic Control Data policy decision to which the PCC

 rule refers.

 - DNAI\_STEERING\_ERROR: Indicates that the enforcement of the steering of traffic to the

 indicated DNAI failed; or the dynamic PCC rule could not be successfully installed or

 modified at the NF service consumer because there is invalid route information for a DNAI(s)

 (e.g. routing profile id is not configured) within the provided Traffic Control Data policy

 decision to which the PCC rule refers.

 - AN\_GW\_FAILED: This value is used to indicate that the AN-Gateway has failed and that the

 PCF should refrain from sending policy decisions to the SMF until it is informed that the

 S-GW has been recovered. This value shall not be used if the SM Policy association

 modification procedure is initiated for PCC rule removal only.

 - MAX\_NR\_PACKET\_FILTERS\_EXCEEDED: This value is used to indicate that the PCC rule could not

 be successfully installed, modified or enforced at the NF service consumer because the

 number of supported packet filters for signalled QoS rules for the PDU session has been

 reached.

 - PACKET\_FILTER\_TFT\_ALLOCATION\_EXCEEDED: This value is used to indicate that the PCC rule is

 removed at 5GS to EPS mobility because TFT allocation was not possible since the number of

 active packet filters in the EPC bearer is exceeded.

 - MUTE\_CHG\_NOT\_ALLOWED: Indicates that the PCC rule could not be successfully modified

 because the mute condition for application detection report cannot be changed. Applicable

 when the functionality introduced with the ADC feature applies.

 AfSigProtocol:

 anyOf:

 - type: string

 enum:

 - NO\_INFORMATION

 - SIP

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

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration and is not used to encode

 content defined in the present version of this API.

 description: |

 Indicates the protocol used for signalling between the UE and the AF.

 Possible values are

 - NO\_INFORMATION: Indicate that no information about the AF signalling protocol is being

 provided.

 - SIP: Indicate that the signalling protocol is Session Initiation Protocol.

 RuleOperation:

 anyOf:

 - type: string

 enum:

 - CREATE\_PCC\_RULE

 - DELETE\_PCC\_RULE

 - MODIFY\_PCC\_RULE\_AND\_ADD\_PACKET\_FILTERS

 - MODIFY\_ PCC\_RULE\_AND\_REPLACE\_PACKET\_FILTERS

 - MODIFY\_ PCC\_RULE\_AND\_DELETE\_PACKET\_FILTERS

 - MODIFY\_PCC\_RULE\_WITHOUT\_MODIFY\_PACKET\_FILTERS

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: |

 Indicates a UE initiated resource operation that causes a request for PCC rules.

 Possible values are

 - CREATE\_PCC\_RULE: Indicates to create a new PCC rule to reserve the resource requested by

 the UE.

 - DELETE\_PCC\_RULE: Indicates to delete a PCC rule corresponding to reserve the resource

 requested by the UE.

 - MODIFY\_PCC\_RULE\_AND\_ADD\_PACKET\_FILTERS: Indicates to modify the PCC rule by adding new

 packet filter(s).

 - MODIFY\_ PCC\_RULE\_AND\_REPLACE\_PACKET\_FILTERS: Indicates to modify the PCC rule by replacing

 the existing packet filter(s).

 - MODIFY\_ PCC\_RULE\_AND\_DELETE\_PACKET\_FILTERS: Indicates to modify the PCC rule by deleting

 the existing packet filter(s).

 - MODIFY\_PCC\_RULE\_WITHOUT\_MODIFY\_PACKET\_FILTERS: Indicates to modify the PCC rule by

 modifying the QoS of the PCC rule.

 RedirectAddressType:

 anyOf:

 - type: string

 enum:

 - IPV4\_ADDR

 - IPV6\_ADDR

 - URL

 - SIP\_URI

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration and is not used to encode

 content defined in the present version of this API.

 description: |

 Indicates the redirect address type.

 Possible values are

 - IPV4\_ADDR: Indicates that the address type is in the form of "dotted-decimal" IPv4

 address.

 - IPV6\_ADDR: Indicates that the address type is in the form of IPv6 address.

 - URL: Indicates that the address type is in the form of Uniform Resource Locator.

 - SIP\_URI: Indicates that the address type is in the form of SIP Uniform Resource

 Identifier.

 QosFlowUsage:

 anyOf:

 - type: string

 enum:

 - GENERAL

 - IMS\_SIG

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration and is not used to encode

 content defined in the present version of this API.

 description: |

 Indicates a QoS flow usage information.

 Possible values are

 - GENERAL: Indicate no specific QoS flow usage information is available.

 - IMS\_SIG: Indicate that the QoS flow is used for IMS signalling only.

 FailureCause:

 description: Indicates the cause of the failure in a Partial Success Report.

 anyOf:

 - type: string

 enum:

 - PCC\_RULE\_EVENT

 - PCC\_QOS\_FLOW\_EVENT

 - RULE\_PERMANENT\_ERROR

 - RULE\_TEMPORARY\_ERROR

 - POL\_DEC\_ERROR

 - type: string

 description: >

 This string provides forward-compatibility with future extensions to the enumeration

 and is not used to encode content defined in the present version of this API.

 CreditManagementStatus:

 description: Indicates the reason of the credit management session failure.

 anyOf:

 - type: string

 enum:

 - END\_USER\_SER\_DENIED

 - CREDIT\_CTRL\_NOT\_APP

 - AUTH\_REJECTED

 - USER\_UNKNOWN

 - RATING\_FAILED

 - type: string

 description: >

 This string provides forward-compatibility with future extensions to the enumeration

 and is not used to encode content defined in the present version of this API.

 SessionRuleFailureCode:

 anyOf:

 - type: string

 enum:

 - NF\_MAL

 - RES\_LIM

 - SESSION\_RESOURCE\_ALLOCATION\_FAILURE

 - UNSUCC\_QOS\_VAL

 - INCORRECT\_UM

 - UE\_STA\_SUSP

 - UNKNOWN\_REF\_ID

 - INCORRECT\_COND\_DATA

 - REF\_ID\_COLLISION

 - AN\_GW\_FAILED

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration and is not used to encode

 content defined in the present version of this API.

 description: |

 Indicates the reason of the session rule failure.

 Possible values are

 - NF\_MAL: Indicates that the PCC rule could not be successfully installed (for those

 provisioned from the PCF) or activated (for those pre-defined in SMF) or enforced (for those

 already successfully installed) due to SMF/UPF malfunction.

 - RES\_LIM: Indicates that the PCC rule could not be successfully installed (for those

 provisioned from PCF) or activated (for those pre-defined in SMF) or enforced (for those

 already successfully installed) due to a limitation of resources at the SMF/UPF.

 - SESSION\_RESOURCE\_ALLOCATION\_FAILURE: Indicates the session rule could not be successfully

 enforced due to failure during the allocation of resources for the PDU session in the UE,

 RAN or AMF.

 - UNSUCC\_QOS\_VAL: indicates that the QoS validation has failed.

 - INCORRECT\_UM: The usage monitoring data of the enforced session rule is not the same for

 all the provisioned session rule(s).

 - UE\_STA\_SUSP: Indicates that the UE is in suspend state.

 - UNKNOWN\_REF\_ID: Indicates that the session rule could not be successfully

 installed/modified because the referenced identifier to a Policy Decision Data or to a

 Condition Data is unknown to the SMF.

 - INCORRECT\_COND\_DATA: Indicates that the session rule could not be successfully

 installed/modified because the referenced Condition data are incorrect.

 - REF\_ID\_COLLISION: Indicates that the session rule could not be successfully

 installed/modified because the same Policy Decision is referenced by a PCC rule (e.g. the

 session rule and the PCC rule refer to the same Usage Monitoring decision data).

 - AN\_GW\_FAILED: Indicates that the AN-Gateway has failed and that the PCF should refrain

 from sending policy decisions to the SMF until it is informed that the S-GW has been

 recovered. This value shall not be used if the SM Policy association modification procedure

 is initiated for session rule removal only.

 SteeringFunctionality:

 anyOf:

 - type: string

 enum:

 - MPTCP

 - ATSSS\_LL

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration and is not used to encode

 content defined in the present version of this API.

 description: |

 Indicates functionality to support traffic steering, switching and splitting determined

 by the PCF.

 Possible values are

 - MPTCP: Indicates that PCF authorizes the MPTCP functionality to support traffic

 steering, switching and splitting.

 - ATSSS\_LL: Indicates that PCF authorizes the ATSSS-LL functionality to support traffic

 steering, switching and splitting.

 SteerModeValue:

 description: Indicates the steering mode value determined by the PCF.

 anyOf:

 - type: string

 enum:

 - ACTIVE\_STANDBY

 - LOAD\_BALANCING

 - SMALLEST\_DELAY

 - PRIORITY\_BASED

 - type: string

 description: >

 This string provides forward-compatibility with future extensions to the enumeration

 and is not used to encode content defined in the present version of this API.

 MulticastAccessControl:

 description: >

 Indicates whether the service data flow, corresponding to the service data flow template, is

 allowed or not allowed.

 anyOf:

 - type: string

 enum:

 - ALLOWED

 - NOT\_ALLOWED

 - type: string

 description: >

 This string provides forward-compatibility with future extensions to the enumeration

 and is not used to encode content defined in the present version of this API.

 RequestedQosMonitoringParameter:

 description: Indicates the requested QoS monitoring parameters to be measured.

 anyOf:

 - type: string

 enum:

 - DOWNLINK

 - UPLINK

 - ROUND\_TRIP

 - CONGESTION\_INFO

 - type: string

 description: >

 This string provides forward-compatibility with future extensions to the enumeration

 and is not used to encode content defined in the present version of this API.

 ReportingFrequency:

 description: Indicates the frequency for the reporting.

 anyOf:

 - type: string

 enum:

 - EVENT\_TRIGGERED

 - PERIODIC

 - SESSION\_RELEASE

 - type: string

 description: >

 This string provides forward-compatibility with future extensions to the enumeration

 and is not used to encode content defined in the present version of this API.

 SgsnAddress:

 description: describes the address of the SGSN

 type: object

 anyOf:

 - required: [sgsnIpv4Addr]

 - required: [sgsnIpv6Addr]

 properties:

 sgsnIpv4Addr:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

 sgsnIpv6Addr:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

 SmPolicyAssociationReleaseCause:

 description: >

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

 association.

 anyOf:

 - type: string

 enum:

 - UNSPECIFIED

 - UE\_SUBSCRIPTION

 - INSUFFICIENT\_RES

 - VALIDATION\_CONDITION\_NOT\_MET

 - REACTIVATION\_REQUESTED

 - type: string

 description: >

 This string provides forward-compatibility with future extensions to the enumeration

 and is not used to encode content defined in the present version of this API.

 PduSessionRelCause:

 description: Contains the SMF PDU Session release cause.

 anyOf:

 - type: string

 enum:

 - PS\_TO\_CS\_HO

 - RULE\_ERROR

 - type: string

 description: >

 This string provides forward-compatibility with future extensions to the enumeration

 and is not used to encode content defined in the present version of this API.

 MaPduIndication:

 description: >

 Contains the MA PDU session indication, i.e., MA PDU Request or MA PDU Network-Upgrade

 Allowed.

 anyOf:

 - type: string

 enum:

 - MA\_PDU\_REQUEST

 - MA\_PDU\_NETWORK\_UPGRADE\_ALLOWED

 - type: string

 description: >

 This string provides forward-compatibility with future extensions to the enumeration

 and is not used to encode content defined in the present version of this API.

 AtsssCapability:

 description: Contains the ATSSS capability supported for the MA PDU Session.

 anyOf:

 - type: string

 enum:

 - MPTCP\_ATSSS\_LL\_WITH\_ASMODE\_UL

 - MPTCP\_ATSSS\_LL\_WITH\_EXSDMODE\_DL\_ASMODE\_UL

 - MPTCP\_ATSSS\_LL\_WITH\_ASMODE\_DLUL

 - ATSSS\_LL

 - MPTCP\_ATSSS\_LL

 - type: string

 description: >

 This string provides forward-compatibility with future extensions to the enumeration

 and is not used to encode content defined in the present version of this API.

#

 NetLocAccessSupport:

 anyOf:

 - type: string

 enum:

 - ANR\_NOT\_SUPPORTED

 - TZR\_NOT\_SUPPORTED

 - LOC\_NOT\_SUPPORTED

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration and is not used to encode

 content defined in the present version of this API.

 description: |

 Indicates the access network support of the report of the requested access network

 information.

 Possible values are

 - ANR\_NOT\_SUPPORTED: Indicates that the access network does not support the report of access

 network information.

 - TZR\_NOT\_SUPPORTED: Indicates that the access network does not support the report of UE

 time zone.

 - LOC\_NOT\_SUPPORTED: Indicates that the access network does not support the report of UE

 Location (or PLMN Id).

 PolicyDecisionFailureCode:

 description: Indicates the type of the failed policy decision and/or condition data.

 anyOf:

 - type: string

 enum:

 - TRA\_CTRL\_DECS\_ERR

 - QOS\_DECS\_ERR

 - CHG\_DECS\_ERR

 - USA\_MON\_DECS\_ERR

 - QOS\_MON\_DECS\_ERR

 - CON\_DATA\_ERR

 - POLICY\_PARAM\_ERR

 - type: string

 description: >

 This string provides forward-compatibility with future extensions to the enumeration

 and is not used to encode content defined in the present version of this API.

#

 NotificationControlIndication:

 description: >

 Indicates that the notification of DDD Status is requested and/or that the notification of

 DDN Failure is requested.

 anyOf:

 - type: string

 enum:

 - DDN\_FAILURE

 - DDD\_STATUS

 - type: string

 description: >

 This string provides forward-compatibility with future extensions to the enumeration

 and is not used to encode content defined in the present version of this API.

#

 SteerModeIndicator:

 description: Contains Autonomous load-balance indicator or UE-assistance indicator.

 anyOf:

 - type: string

 enum:

 - AUTO\_LOAD\_BALANCE

 - UE\_ASSISTANCE

 - type: string

 description: >

 This string provides forward-compatibility with future extensions to the enumeration

 and is not used to encode content defined in the present version of this API.

#

\* \* \* \* End of changes \* \* \* \*