**3GPP TSG-CT WG3 Meeting #136 C3-244476**

**Maastricht, NL, 19 – 23 Aug, 2024 is revision of C3-244389**

|  |
| --- |
| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  | **29.565** | **CR** | **0148** | **rev** | **1** | **Current version:** | **18.6.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
|  |

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

|  |
| --- |
|  |
| ***Title:***  | QoS Monitoring enhancement on capability report |
|  |  |
| ***Source to WG:*** | China Mobile, Huawei |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | TEI19\_QME |  | ***Date:*** | 2024-08-18 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-19 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)Rel-20 (Release 20)* |
|  |  |
| ***Reason for change:*** | 3GPP TS 23.503 CR1300 specifies that AF may subscribe whether the Qos monitoring can be performed or not. |
|  |  |
| ***Summary of change:*** | * The subscription to QOS\_MON\_CAP\_REPO event and the report of whether QoS monitoring is no longer or can again be performed.
 |
|  |  |
| ***Consequences if not approved:*** | Not aligned with stage 2 definition. |
|  |  |
| ***Clauses affected:*** | 5.3.2.2.8, 6.2.6.1, 6.2.6.2.7, 6.2.6.3.3, 6.2.8, A.3 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** | This CR introduce a backwards compatible feature to the Ntsctsf\_QoSandTSCAssistance OpenAPI. |
|  |  |
| ***This CR's revision history:*** |  |

**Additional discussion(if needed):**

**Proposed changes:**

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

5.3.2.2.8 Initial provisioning of AF requested QoS for a UE or group of UE(s) not identified by UE address(es)

When the "GMEC" feature is supported, if the NF service consumer includes in the HTTP POST request message defined in clause 5.3.2.2.2 the targeted UE identified by its GPSI, within the "ueId" attribute, or the targeted group of UE(s) identified by its External Group ID, within the "externalGroupId" attribute, the provisions of clause 5.3.2.2.2 shall apply with the following differences:

- The AF request may include:

a. the temporal invalidity conditions, within the "tempInValidity" attribute;

b. the event(s) subscription, including the QoS monitoring parameters, within the "evSubsc" attribute;

c. the traffic characteristics and, if applicable, QoS parameters, within the "tscQosReq" attribute;

d. the QoS parameters, within either the "qosReference" attribute, the "altQosReferences" attribute or the "altQosReqs" attribute; and/or

e. the flow description, within either the "flowInfo" attribute, the "ethFlowInfo" attribute or the "enEthFlowInfo" attribute.

The TSCTSF shall process the request and reply to the NF service consumer as defined in clause 5.3.2.2.2 with the following differences:

- Upon reception of the HTTP request from the NF service consumer, and if the request is authorized, the TSCTSF shall:

- create a new "Individual TSC Application Session Context" resource;

- if the "externalGroupId" attribute is received from the NF service consumer, interact with the UDM to retrieve the list of SUPI(s) identifying the UE(s) constituting the targeted group of UE(s) using the Nudm\_SDM service as defined in 3GPP TS 29.503 [24];

- if the "ueId" attribute is received from the NF service consumer, interact with the UDM to retrieve the SUPI that corresponds to the targeted GPSI using the Nudm\_SDM service as defined in 3GPP TS 29.503 [24];

- use the parameters received from the NF service consumer (i.e., DNN, S-NSSAI, the identifier of the targeted UE or group of UE(s)) to determine the corresponding AF session(s) (i.e., to which they macth); and

- for each matching AF session, interact with the PCF by invoking the Npcf\_PolicyAuthorization\_Create/Update service operation, as defined in 3GPP TS 29.514 [20], to create/update the AF session based on the provided requested QoS parameters.

NOTE 1: If the PCF determines that an existing PDU Session is potentially impacted by the time synchronization service (based on local configuration or SM Policy Association), the PCF invokes Npcf\_PolicyAuthorization\_Notify service operation towards the TSCTSF as defined in clause 4.2.5.16 of 3GPP TS 29.514 [20] to send the received TSC User Plane Node information. The TSCTSF then retrieves from the BSF the PCF binding information (including the UE Identities for the notified PDU session), as specified in 3GPP TS 29.521 [23], and can create the AF session by invoking the Npcf\_PolicyAuthorization\_Create service operation towards the PCF.

- The TSCTSF shall handle the AF session(s) associated with a given "Individual TSC Application Session Context" resource as follows:

- For the association of the AF session(s) at the PCF to the "Individual TSC Application Session Context" resource:

a. Upon PDU Session establishment, i.e. when the TSCTSF receives a Npcf\_PolicyAuthorization\_Notify service operation following the establishment of a new PDU session, the TSCTSF shall retrieve from the BSF, as specified in 3GPP TS 29.521 [23], the PCF binding information to complete the necessary AF session information. The TSCTSF shall then trigger the Npcf\_PolicyAuthorization\_Create service operation towards the PCF to create an AF session to subscribe to TSC user plane node related event(s). The TSCTSF shall use the parameters of the existing "Individual TSC Application Session Context" resources to determine whether they shall be associated to this newly created AF session. The TSCTSF associates the new AF session to the "Individual TSC Application Session Context" resource to which these parameters match.

b. Upon "Individual TSC Application Session Context" resource creation, the TSCTSF uses the parameters of the created resource to determine which existing AF session(s) it matches. The TSCTSF then associates the new "Individual TSC Application Session Context" resource to the corresponding AF session(s).

- To remove an AF session from the list of AF session(s) associated to an "Individual TSC Application Session Context" resource, when the TSCTSF receives the Npcf\_PolicyAuthorization\_Notify service operation from the PCF indicating the termination of the corresponding existing PDU session, the TSCTSF triggers the Npcf\_PolicyAuthorization\_Delete service operation towards the PCF and determines if the corresponding AF session is associated with the "Individual TSC Application Session Context" resource. If it is the case, the TSCTSF shall remove the AF session from the list of AF session(s) associated with the "Individual TSC Application Session Context" resource.

NOTE 2: After the TSCTSF retrieves from the BSF the PCF binding information (including the UE Identities for the notified PDU session), as specified in 3GPP TS 29.521 [23], the TSCTSF can store internally the information required to invoke Npcf\_PolicyAuthorization\_Create service operation and delay the Npcf\_PolicyAuthorization\_Create service operation (i.e., the creation of the AF session) until a request is received for the concerned UE (e.g., time synchronization capability exposure or QoS provisioning request). In this case, when the TSCTSF receives a request for the concerned UE (e.g., time synchronization capability exposure or QoS provisioning request), the TSCTSF interacts with the PCF by triggering the Npcf\_PolicyAuthorization\_Create service operation as defined in 3GPP TS 29.514 [20].

NOTE 3: When the TSCTSF receives the Npcf\_PolicyAuthorization\_Notify service operation indicating the termination of an existing PDU session associated to an AF session that is not associated with any "Individual Time Synchronization Exposure Subscription" resource nor "Individual TSC Application Session Context resource" resource, the TSCTSF removes the AF session and triggers the Npcf\_PolicyAuthorization\_Delete service operation towards the PCF.

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

#### 6.2.6.1 General

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

Table 6.2.6.1-1 specifies the data types defined for the Ntsctsf\_QoSandTSCAssistance service based interface protocol.

Table 6.2.6.1-1: Ntsctsf\_QoSandTSCAssistance specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| AdditionalInfoTsctsfQosTscac | 6.2.6.2.8 | Describes additional error information specific for this API. |  |
| EventsNotification | 6.2.6.2.6 | Describes the notification(s) about the event(s) occurred within an Individual TSC Application Session Context resource. |  |
| EventNotification | 6.2.6.2.7 | Describes the notification for an Event. |  |
| EventsSubscReqData | 6.2.6.2.3 | Identifies the events the application subscribes to within an Individual TSC Application Session Context resource |  |
| EventsSubscReqDataRm | 6.2.6.2.5 | This data type is defined in the same way as the "EventsSubscReqData" data type, but with the OpenAPI "nullable: true" property. |  |
| ProblemDetailsTsctsfQosTscac | 6.2.6.4.1 | Problem details as defined in 3GPP TS 29.571 [15] extended with specific error information for this API, as described in AdditionalInfoTsctsfQosTscac data type. |  |
| TemporalInValidity | 6.2.6.2.9 | Represents the temporal invalidity conditions, i.e., the time interval during which the NF service consumer request shall not to be applied. | GMEC |
| TscAppSessionContextData | 6.2.6.2.2 | Represents the Individual TSC Application Session Context resource data. |  |
| TscAppSessionContextUpdateData | 6.2.6.2.4 | Describes the modifications to an Individual TSC Application Session Context resource. |  |
| TscEvent | 6.2.6.3.3 | Indicates the subscribed event(s). |  |

Table 6.2.6.1-2 specifies data types re-used by the Ntsctsf\_QoSandTSCAssistance service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Ntsctsf\_QoSandTSCAssistance service based interface.

Table 6.2.6.1-2: Ntsctsf\_QoSandTSCAssistance re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| AcceptableServiceInfo | 3GPP TS 29.514 [20] | Acceptable maximum requested bandwidth. |  |
| AccumulatedUsage | 3GPP TS 29.122 [21] | Accumulated Usage. |  |
| AlternativeServiceRequirementsData | 3GPP TS 29.514 [20] | Contains alternative QoS related parameter sets. |  |
| AspId | 3GPP TS 29.514 [20] | Contains an identity of an application service provider. |  |
| BatOffsetInfo | 3GPP TS 29.514 [20] | Contains the offset of the BAT and the optionally adjusted periodicity. | EnTSCAC |
| DateTime | 3GPP TS 29.571 [15] | Represents a date and a time. | GMEC |
| Dnn | 3GPP TS 29.571 [15] | The DNN the user is connected to. |  |
| ExternalGroupId | 3GPP TS 29.571 [15] | Represents the identifier of an External Group. | GMEC |
| EthFlowDescription | 3GPP TS 29.514 [20] | Defines a packet filter for an Ethernet flow. |  |
| EthFlowInfo | 3GPP TS 29.122 [21] | Contains an UL and/or DL Flow information. | Ethernet\_UL/DL\_Flows |
| FlowInfo | 3GPP TS 29.122 [21] | Contains the IP data flow information. |  |
| Gpsi | 3GPP TS 29.571 [15] | Represents a GPSI. | GMEC |
| IpAddr | 3GPP TS 29.571 [15] | Contains the IP address. |  |
| MacAddr48 | 3GPP TS 29.571 [15] | MAC Address. |  |
| NotifCap | 3GPP TS 29.514 [20] | Indicates whether the QoS Monitoring can be performed or not. | QoSMonCapRepo |
| ProblemDetails | 3GPP TS 29.571 [15] | Problem Details when returning an error response. |  |
| QosMonitoringInformation | 3GPP TS 29.122 [21] | Contains Qos Monitoring information. |  |
| QosMonitoringInformationRm | 3GPP TS 29.122 [21] | This data type is defined in the same way as the "QosMonitoringInformation" data type, but with the OpenAPI "nullable: true" property. |  |
| QosMonitoringReport | 3GPP TS 29.122 [21] | Contains Qos Monitoring Report information. |  |
| RedirectResponse | 3GPP TS 29.571 [15] | Contains redirection related information. |  |
| Snssai | 3GPP TS 29.571 [15] | Identifies the S-NSSAI. |  |
| SponId | 3GPP TS 29.514 [20] | Contains an Identity of a sponsor. |  |
| SponsoringStatus | 3GPP TS 29.514 [20] | Represents whether sponsored data connectivity is enabled or disabled/not enabled. |  |
| SubscribedEvent | 3GPP TS 29.522 [17] | Indicates the subscribed event. |  |
| SupportedFeatures | 3GPP TS 29.571 [15] | Used to negotiate the applicability of the optional features defined in table 5.8-1. |  |
| TerminationInfo | 3GPP TS 29.514 [20] | Includes information related to the termination of the Individual TSC Application Session Context resource. |  |
| TscQosRequirement | 3GPP TS 29.122 [21] | Contains the QoS requirements for time sensitive communication. |  |
| TscQosRequirementRm | 3GPP TS 29.122 [21] | This data type is defined in the same way as the "TscQosRequirement" data type, but with removable attributes. |  |
| UsageThreshold | 3GPP TS 29.122 [21] | Time period and/or traffic volume in which the QoS is to be applied. |  |
| UsageThresholdRm | 3GPP TS 29.122 [21] | This data type is defined in the same way as the "UsageThreshold" data type, but with the OpenAPI "nullable: true" property. |  |
| Uri | 3GPP TS 29.571 [15] | Identifies a referenced resource. |  |

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

##### 6.2.6.2.7 Type EventNotification

Table 6.2.6.2.7-1: Definition of type EventNotification

| Attribute name | Data type | P | Cardinality | Description | Applicability |
| --- | --- | --- | --- | --- | --- |
| event | TscEvent | M | 1 | Indicates the event reported by the TSCTSF. |  |
| flowIds | array(integer) | O | 1..N | Identifies the flows that were sent during event subscription |  |
| qosMonReports | array(QosMonitoringReport) | C | 1..N | QoS Monitoring reporting information. It shall be present when the notified event is "QOS\_MONITORING". |  |
| appliedQosRef | string | C | 0..1 | The currently applied alternative QoS requirement referring to an alternative QoS reference or a requested alternative QoS parameter set. Applicable for event QOS\_NOT\_GUARANTEED or SUCCESSFUL\_RESOURCES\_ALLOCATION.When it is omitted and the "event" attribute is QOS\_NOT\_GUARANTEED, the event report indicates that the lowest priority alternative QoS profile could not be fulfilled either. |  |
| usgRep | AccumulatedUsage | C | 0..1 | Indicates the measured volume and/or time for sponsored data connectivity. Applicable for event USAGE\_REPORT. |  |
| altQosNotSuppInd | boolean | O | 0..1 | It may be set to true when the "event" attribute is QOS\_NOT\_GUARANTEED to indicate that alternative service requirements are not supported by NG-RAN. The default value false shall apply if the attribute is not present. | AltQoSProfilesSupportReport |
| batOffsetInfo | BatOffsetInfo | C | 0..1 | The offset of the BAT and the optionally adjusted periodicity.It shall be present if available when the notified event is "BAT\_OFFSET\_INFO". | EnTSCAC |
| qosMonCapRepo | NotifCap | C | 0..1 | QoS Monitoring can be performed or not.It shall be present if available when the notified event is "QOS\_MON\_CAP\_REPO". | QoSMonCapRepo |

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

##### 6.2.6.3.3 Enumeration: TscEvent

The enumeration TscEvent represents event for TSC. It shall comply with the provisions defined in table 6.2.6.3.3-1.

Table 6.2.6.3.3-1: Enumeration TscEvent

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| FAILED\_RESOURCES\_ALLOCATION | Indicates that one or more of the SDFs of an Individual TSC Application Session Context are deactivated. It also indicates that the resources requested for a particular service information cannot be successfully allocated. |  |
| SUCCESSFUL\_RESOURCES\_ALLOCATION | Indicates that the resources requested for particular service information have been successfully allocated. |  |
| QOS\_GUARANTEED | The QoS targets of one or more SDFs are guaranteed again. |  |
| QOS\_NOT\_GUARANTEED | The QoS targets of one or more SDFs are not being guaranteed. |  |
| QOS\_MONITORING | Indicates a QoS monitoring event. |  |
| USAGE\_REPORT | Volume and/or time usage for sponsored data connectivity. |  |
| BAT\_OFFSET\_INFO | Indicates the BAT offset and the optionally adjusted periodicity. | EnTSCAC |
| QOS\_MON\_CAP\_REPO | Indicates the report of the capability of the QoS Monitoring. | QoSMonCapRepo |

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

### 6.2.8 Feature negotiation

The optional features in table 6.2.8-1 are defined for the Ntsctsf\_QoSandTSCAssistance API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.2.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| 1 | Ethernet\_UL/DL\_Flows | Indicates the support of the description of the Ethernet flows as the combination of Flow Identifier, and UL and/or DL Ethernet flows. |
| 2 | PacketDelayFailureReport | Indicates the support of packet delay failure report as part of QoS Monitoring procedures.  |
| 3 | ExtQoS | Indicates the support of extended QoS parameters. |
| 4 | EnTSCAC | Indicates the support of extensions to TSCAC, e.g. burst arrival time window adaptation, periodicity adjustment, and subsequent BAT offset report. |
| 5 | AltQoSProfilesSupportReport | This feature indicates the support of the report of whether Alternative QoS parameters are supported by NG-RAN.  |
| 6 | GMEC | This feature indicates the support of Generic Group Management, Exposure and Communication Enhancements.The following functionalities are supported:- AF requested QoS for a UE or a group of UE(s) not identified by UE address(es). |
| 7 | QoSMonCapRepo | This feature indicates the support QoS Monitoring Capability Report. |

Editor's Note: Whether the QoSMonCapRepo feature can be support for separate the monitoring of different QoS Monitoring type what QOS\_MONITORING event applies is FFS.

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

# A.3 Ntsctsf\_QoSandTSCAssistance API

openapi: 3.0.0

info:

 title: Ntsctsf\_QoSandTSCAssistance Service API

 version: 1.1.0

 description: |

 TSCTSF QoS and TSC Assistance Service.

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externalDocs:

 description: >

 3GPP TS 29.565 V18.6.0; 5G System; Time Sensitive Communication and Time Synchronization function

 Services; Stage 3.

 url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.565/'

servers:

 - url: '{apiRoot}/ntsctsf-qos-tscai/v1'

 variables:

 apiRoot:

 default: https://example.com

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

security:

 - {}

 - oAuth2ClientCredentials:

 - ntsctsf-qos-tscai

paths:

 /tsc-app-sessions:

 post:

 summary: Creates a new Individual TSC Application Session Context resource

 operationId: PostTSCAppSessions

 tags:

 - TSC Application Sessions (Collection)

 requestBody:

 description: Contains the information for the creation the resource.

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '201':

 description: Successful creation of the resource.

 content:

 application/json:

 schema:

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

 headers:

 Location:

 description: >

 Contains the URI of the created individual TSC application session context resource,

 according to the structure

 {apiRoot}/ntsctsf-qos-tscai/<apiVersion>/tsc-app-sessions/{appSessionId} or the

 URI of the created events subscription sub-resource, according to the structure

 {apiRoot}/ntsctsf-qos-tscai/<apiVersion>/tsc-app-sessions/{appSessionId}/

 events-subscription}

 required: true

 schema:

 type: string

 '400':

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

 '401':

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

 '403':

 description: Forbidden

 content:

 application/problem+json:

 schema:

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

 headers:

 Retry-After:

 description: >

 Indicates the time the AF has to wait before making a new request. It can be a

 non-negative integer (decimal number) indicating the number of seconds the AF

 has to wait before making a new request or an HTTP-date after which the AF can

 retry a new request.

 schema:

 type: string

 '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:

 terminationRequest:

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

 post:

 requestBody:

 description: >

 Request of the termination of the Individual TSC Application Session Context

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '204':

 description: The receipt of the notification is acknowledged.

 '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'

 eventNotification:

 '{$request.body#/evSubsc/notifUri}/notify':

 post:

 requestBody:

 description: Notification of an event occurrence in the TSCTSF.

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '204':

 description: The receipt of the notification is acknowledged.

 '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'

 /tsc-app-sessions/{appSessionId}:

 get:

 summary: Reads an existing Individual TSC Application Session Context

 operationId: GetTSCAppSession

 tags:

 - Individual TSC Application Session Context (Document)

 parameters:

 - name: appSessionId

 description: String identifying the resource.

 in: path

 required: true

 schema:

 type: string

 responses:

 '200':

 description: A representation of the resource is returned.

 content:

 application/json:

 schema:

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

 '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'

 patch:

 summary: Modifies an existing Individual TSC Application Session Context

 operationId: ModAppSession

 tags:

 - Individual TSC Application Session Context (Document)

 parameters:

 - name: appSessionId

 description: String identifying the resource.

 in: path

 required: true

 schema:

 type: string

 requestBody:

 description: Modification of the resource.

 required: true

 content:

 application/merge-patch+json:

 schema:

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

 responses:

 '200':

 description: >

 successful modification of the resource and a representation of that resource is

 returned.

 content:

 application/json:

 schema:

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

 '204':

 description: The successful modification.

 '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':

 description: Forbidden

 content:

 application/problem+json:

 schema:

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

 headers:

 Retry-After:

 description: >

 Indicates the time the AF has to wait before making a new request. It can be a

 non-negative integer (decimal number) indicating the number of seconds the AF

 has to wait before making a new request or an HTTP-date after which the AF can

 retry a new request.

 schema:

 type: string

 '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:

 eventNotification:

 '{$request.body#/evSubsc/notifUri}/notify':

 post:

 requestBody:

 description: Notification of an event occurrence in the TSCTSF.

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '204':

 description: The receipt of the notification is acknowledged.

 '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'

 /tsc-app-sessions/{appSessionId}/delete:

 post:

 summary: Deletes an existing Individual TSC Application Session Context

 operationId: DeleteTSCAppSession

 tags:

 - Individual TSC Application Session Context (Document)

 parameters:

 - name: appSessionId

 description: String identifying the Individual TSC Application Session Context resource.

 in: path

 required: true

 schema:

 type: string

 requestBody:

 description: >

 Deletion of the Individual TSC Application Session Context resource, request notification.

 required: false

 content:

 application/json:

 schema:

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

 responses:

 '200':

 description: The deletion of the resource is confirmed and a resource is returned

 content:

 application/json:

 schema:

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

 '204':

 description: The deletion is confirmed without returning additional data.

 '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'

 /tsc-app-sessions/{appSessionId}/events-subscription:

 put:

 summary: Creates or modifies an Events Subscription subresource

 operationId: putEventsSubsc

 tags:

 - Events Subscription (Document)

 parameters:

 - name: appSessionId

 description: String identifying the Events Subscription resource

 in: path

 required: true

 schema:

 type: string

 requestBody:

 description: Creation or modification of an Events Subscription resource.

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '201':

 description: >

 The creation of the Events Subscription resource is confirmed and its representation is

 returned.

 content:

 application/json:

 schema:

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

 headers:

 Location:

 description: >

 Contains the URI of the created Events Subscription resource,

 according to the structure

 {apiRoot}/ntsctsf-qos-tscai/<apiVersion>/tsc-app-sessions/{appSessionId}/

 events-subscription}

 required: true

 schema:

 type: string

 '200':

 description: >

 The modification of the Events Subscription resource is confirmed and its representation

 is returned.

 content:

 application/json:

 schema:

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

 '204':

 description: >

 The modification of the Events Subscription subresource is confirmed without returning

 additional data.

 '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'

 callbacks:

 eventNotification:

 '{$request.body#/notifUri}/notify':

 post:

 requestBody:

 description: >

 Contains the information for the notification of an event occurrence in the TSCTSF.

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '204':

 description: The receipt of the notification is acknowledged.

 '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'

 delete:

 summary: Deletes the Events Subscription subresource.

 operationId: DeleteEventsSubsc

 tags:

 - Events Subscription (Document)

 parameters:

 - name: appSessionId

 description: String identifying the Individual TSC Application Session Context resource

 in: path

 required: true

 schema:

 type: string

 responses:

 '204':

 description: >

 The deletion of the of the Events Subscription sub-resource is confirmed without returning

 additional data.

 '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'

 '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'

components:

 securitySchemes:

 oAuth2ClientCredentials:

 type: oauth2

 flows:

 clientCredentials:

 tokenUrl: '{nrfApiRoot}/oauth2/token'

 scopes:

 ntsctsf-qos-tscai: Access to the Ntsctsf\_QoSandTSCAssistance API

 schemas:

 TscAppSessionContextData:

 description: Represents an Individual TSC Application Session Context resource.

 type: object

 required:

 - notifUri

 - afId

 - qosReference

 allOf:

 - oneOf:

 - required: [ueIpAddr]

 - required: [ueMac]

 - required: [ueId]

 - required: [externalGroupId]

 - not:

 required: [ethFlowInfo, enEthFlowInfo]

 - not:

 required: [altQosReqs, altQosReferences]

 properties:

 ueIpAddr:

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

 ipDomain:

 type: string

 description: The IPv4 address domain identifier.

 ueMac:

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

 ueId:

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

 externalGroupId:

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

 dnn:

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

 snssai:

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

 notifUri:

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

 appId:

 type: string

 description: Identifies the Application Identifier.

 ethFlowInfo:

 type: array

 items:

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

 minItems: 1

 enEthFlowInfo:

 type: array

 items:

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

 minItems: 1

 description: >

 Identifies the Ethernet flows which require QoS. Each Ethernet flow consists of a flow

 identifer and the corresponding UL and/or DL flows.

 flowInfo:

 type: array

 items:

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

 minItems: 1

 afId:

 type: string

 description: Identifies the AF identifier.

 tscQosReq:

 $ref: 'TS29122\_AsSessionWithQoS.yaml#/components/schemas/TscQosRequirement'

 qosReference:

 type: string

 description: Identifies a pre-defined QoS information.

 altQosReferences:

 type: array

 items:

 type: string

 minItems: 1

 description: Identifies an ordered list of pre-defined QoS information.

 altQosReqs:

 type: array

 items:

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

 minItems: 1

 description: >

 Identifies an ordered list of alternative service requirements that include individual

 QoS parameter sets. The lower the index of the array for a given entry, the higher the

 priority.

 aspId:

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

 sponId:

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

 sponStatus:

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

 evSubsc:

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

 tempInValidity:

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

 suppFeat:

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

 TscAppSessionContextUpdateData:

 description: >

 Describes the authorization data of an Individual TSC Application Session Context created by

 the PCF.

 type: object

 properties:

 notifUri:

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

 appId:

 type: string

 description: Identifies the Application Identifier.

 ethFlowInfo:

 type: array

 items:

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

 minItems: 1

 enEthFlowInfo:

 type: array

 items:

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

 minItems: 1

 description: >

 Identifies the Ethernet flows which require QoS. Each Ethernet flow consists of a flow

 identifer and the corresponding UL and/or DL flows.

 flowInfo:

 type: array

 items:

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

 minItems: 1

 tscQosReq:

 $ref: 'TS29122\_AsSessionWithQoS.yaml#/components/schemas/TscQosRequirementRm'

 qosReference:

 type: string

 description: Identifies a pre-defined QoS information.

 altQosReferences:

 type: array

 items:

 type: string

 minItems: 1

 description: Identifies an ordered list of pre-defined QoS information.

 altQosReqs:

 type: array

 items:

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

 minItems: 1

 description: >

 Identifies an ordered list of alternative service requirements that include individual

 QoS parameter sets. The lower the index of the array for a given entry, the higher the

 priority.

 aspId:

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

 sponId:

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

 sponStatus:

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

 evSubsc:

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

 tempInValidity:

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

 EventsSubscReqData:

 description: Identifies the events the application subscribes to.

 type: object

 required:

 - events

 - notifUri

 - notifCorreId

 properties:

 events:

 type: array

 items:

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

 minItems: 1

 notifUri:

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

 qosMon:

 $ref: 'TS29122\_AsSessionWithQoS.yaml#/components/schemas/QosMonitoringInformation'

 usgThres:

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

 notifCorreId:

 type: string

 EventsSubscReqDataRm:

 description: >

 This data type is defined in the same way as the EventsSubscReqData data type, but with the

 OpenAPI nullable property set to true.

 type: object

 required:

 - events

 properties:

 events:

 type: array

 items:

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

 minItems: 1

 notifUri:

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

 qosMon:

 $ref: 'TS29122\_AsSessionWithQoS.yaml#/components/schemas/QosMonitoringInformationRm'

 usgThres:

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

 notifCorreId:

 type: string

 nullable: true

 EventsNotification:

 description: Describes the notification of matched events.

 type: object

 required:

 - notifCorreId

 - events

 properties:

 notifCorreId:

 type: string

 events:

 type: array

 items:

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

 minItems: 1

 EventNotification:

 description: Describes a notification of an matched event.

 type: object

 required:

 - event

 properties:

 event:

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

 flowIds:

 type: array

 items:

 type: integer

 minItems: 1

 description: Identifies the IP flows that were sent during event subscription.

 qosMonReports:

 type: array

 items:

 $ref: 'TS29122\_AsSessionWithQoS.yaml#/components/schemas/QosMonitoringReport'

 minItems: 1

 usgRep:

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

 appliedQosRef:

 type: string

 description: >

 The currently applied alternative QoS requirement referring to an alternative QoS

 reference or a requested alternative QoS parameter set. Applicable for

 event QOS\_NOT\_GUARANTEED or SUCCESSFUL\_RESOURCES\_ALLOCATION.

 altQosNotSuppInd:

 type: boolean

 description: >

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

 supported by NG-RAN. Applicable for

 event QOS\_NOT\_GUARANTEED or SUCCESSFUL\_RESOURCES\_ALLOCATION.

 batOffsetInfo:

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

 qosMonCapRepo:

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

 AdditionalInfoTsctsfQosTscac:

 description: Describes additional error information specific for this API.

 type: object

 properties:

 acceptableServInfo:

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

 TemporalInValidity:

 description: >

 Represents the temporal invalidity conditions, i.e., the time interval(s) during

 which the AF request is not to be applied.

 type: object

 properties:

 startTime:

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

 stopTime:

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

 required:

 - startTime

 - stopTime

#

# ENUMERATIONS DATA TYPES

#

 TscEvent:

 description: Represents an event to notify to the AF.

 anyOf:

 - type: string

 enum:

 - FAILED\_RESOURCES\_ALLOCATION

 - QOS\_MONITORING

 - QOS\_GUARANTEED

 - QOS\_NOT\_GUARANTEED

 - SUCCESSFUL\_RESOURCES\_ALLOCATION

 - USAGE\_REPORT

 - BAT\_OFFSET\_INFO

 - QOS\_MON\_CAP\_REPO

 - 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.

#

# ALTERNATIVE DATA TYPES OR COMBINATIONS OF DATA TYPES

#

 ProblemDetailsTsctsfQosTscac:

 description: Extends ProblemDetails to also include the acceptable service info.

 allOf:

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

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

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