**3GPP TSG-CT WG3 Meeting #108-eC3-201122**

[**E-Meeting**](https://www.3gpp.org/ftp/tsg_ct/WG3_interworking_ex-CN3/TSGC3_108_Sophia_Antipolis/)**, 19th -28th February 2020 (Revision of C3-201xyz)**

|  |
| --- |
| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **29.122** | **CR** | **0222** | **rev** | **-** | **Current version:** | **16.4.0** |  |
|  |
| *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 Support |
|  |  |
| ***Source to WG:*** | Huawei |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | 5G\_URLLC |  | ***Date:*** | 2020-02-28 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-16 |
|  | *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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | Stage 2 agrees that the AF can request the QoS Monitoring by invoking the Nnef\_AFsessionWithQoS service operation. |
|  |  |
| ***Summary of change:*** | Update the AsSessionWithQoS API. |
|  |  |
| ***Consequences if not approved:*** | QoS Monitoring feature can’t be supported. |
|  |  |
| ***Clauses affected:*** | 5.2.1.2.6, 5.14.2.1.1, 5.14.2.1.2, 5.14.2.1.3, 5.14.4, A.2, A.14 |
|  |  |
|  | **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 introduces a backwards compatible feature to the OpenAPI file of AsSessionWithQoS API. |
|  |  |
| ***This CR's revision history:*** |  |

\*\*\* 1st Change \*\*\*

##### 5.14.2.1.1 Introduction

This clause defines data structures to be used in resource representations, including subscription resources.

Table 5.14.2.1.1-1 specifies data types re-used by the AsSessionWithQoS API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the AsSessionWithQoS API.

Table 5.14.2.1.1-1: AsSessionWithQoS API re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| EthFlowDescription | 3GPP TS 29.514 [52] | Defines a packet filter for an Ethernet flow.(NOTE 1) |
| MacAddr48 | 3GPP TS 29.571 [45] | MAC Address. |
| ReportingFrequency | 3GPP TS 29.512 [8] | Indicates the frequency for the reporting, such as event triggered, periodic, when the PDU Session is released, and/or any combination. (NOTE) |
| RequestedQosMonitoringParameter | 3GPP TS 29.512 [8] | Indicate the UL packet delay, DL packet delay or round trip packet delay between the UE and the UPF is to be monitored when the QoS Monitoring for URLLC is enabled for the service data flow. (NOTE 2) |
| SupportedFeatures | 3GPP TS 29.571 [45] | Used to negotiate the applicability of the optional features defined in table 5.14.4-1. |
| NOTE 1: In order to support a set of MAC addresses with a specific range in the traffic filter, feature MacAddressRange as specified in clause 5.8 shall be supported.NOTE 2: In order to support QoS Monitoring, feature QoSMonitoring\_5G as specified in clause 5.8 shall be supported. |

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

##### 5.14.2.1.2 Type: AsSessionWithQoSSubscription

This type represents an AS session request with specific QoS for the service provided by the SCS/AS to the SCEF via T8 interface. The structure is used for subscription request and response.

Table 5.14.2.1.2-1: Definition of type AsSessionWithQoSSubscription

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| self | Link | 0..1 | Link to the resource "Individual AS Session with Required QoS Subscription".This parameter shall be supplied by the SCEF in HTTP responses. |  |
| supportedFeatures | SupportedFeatures | 0..1 | Used to negotiate the supported optional features of the API as described in subclause 5.2.7.This attribute shall be provided in the POST request and in the response of successful resource creation. |  |
| notificationDestination | Link | 1 | Contains the URL to receive the notification bearer level event(s) from the SCEF. |  |
| flowInfo | array(FlowInfo) | 0..N | Describe the IP data flow which requires QoS.(NOTE 2) |  |
| ethFlowInfo | array(EthFlowDescription) | 0..N | Identifies Ethernet packet flows.(NOTE 2) | EthAsSessionQoS\_5G |
| qosReference | string | 0..1 | Identifies a pre-defined QoS information |  |
| ueIpv4Addr | Ipv4Addr | 0..1 | The Ipv4 address of the UE.(NOTE 2) |  |
| ueIpv6Addr | Ipv6Addr | 0..1 | The Ipv6 address of the UE. (NOTE 2) |  |
| macAddr | MacAddr48 | 0..1 | Identifies the MAC address.(NOTE 2) | EthAsSessionQoS\_5G |
| usageThreshold | UsageThreshold | 0..1 | Time period and/or traffic volume in which the QoS is to be applied. |  |
| sponsorInfo | SponsorInformation | 0..1 | Indicates a sponsor information |  |
| requestTestNotification | boolean | 0..1 | Set to true by the SCS/AS to request the SCEF to send a test notification as defined in subclause 5.2.5.3. Set to false or omitted otherwise. | Notification\_test\_event |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol as defined in subclause 5.2.5.4. | Notification\_websocket |
| qosMonInfo | QosMonitoringInformation | 0..1 | Qos Monitoring information. It can be present when the event "QOS\_MONITORING" is subscribed. | QoSMonitoring\_5G |
| NOTE 1: Properties marked with a feature as defined in subclause 5.14.4 are applicable as described in subclause 5.2.7. If no features are indicated, the related property applies for all the features.NOTE 2: One of "ueIpv4Addr", "ueIpv6Addr" or "macAddr" shall be included. If ipv4 or ipv6 address is provided, IP flow information shall be provided. If MAC address is provided, Ethernet flow information shall be provided. |

##### 5.14.2.1.3 Type: AsSessionWithQoSSubscriptionPatch

This type represents an AS session request with specific QoS for the service provided by the SCS/AS to the SCEF via T8 interface. The structure is used for PATCH request.

Table 5.14.2.1.3-1: Definition of type AsSessionWithQoSSubscriptionPatch

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| flowInfo | array(FlowInfo) | 0..N | Describe the data flow which requires QoS. |  |
| ethFlowInfo | array(EthFlowDescription) | 0..N | Describes Ethernet packet flows. | EthAsSessionQoS\_5G |
| qosReference | string | 0..1 | Pre-defined QoS reference  |  |
| usageThreshold | UsageThresholdRm | 0..1 | Time period and/or traffic volume in which the QoS is to be applied. |  |
| qosMonInfo | QosMonitoringInformationRm | 0..1 | Qos Monitoring information. It can be present when the event "QOS\_MONITORING" is subscribed. | QoSMonitoring |
| NOTE: Properties marked with a feature as defined in subclause 5.14.4 are applicable as described in subclause 5.2.7. If no features are indicated, the related property applies for all the features. |

##### 5.14.2.1.x1 Type: QosMonitoringInformation

Table 5.14.2.1.x1-1: Definition of type QosMonitoringInformation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| reqQosMonParams | array(RequestedQosMonitoringParameter) | 1..N | Indicates the UL packet delay, DL packet delay and/or round trip packet delay between the UE and the UPF is to be monitored when the QoS Monitoring for URLLC is enabled for the service data flow. |  |
| repFreqs | array(ReportingFrequency) | 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 | 0..1 | Unsigned integer identifying a threshold in units of milliseconds for DL packet delay. It shall be present when the AF requests to report the downlink delay when a delay is exceeding the DL delay threshold. |  |
| repThreshUl | integer | 0..1 | Unsigned integer identifying a threshold in units of milliseconds for UL packet delay. It shall be present when the AF requests to report the uplink delay when a delay is exceeding the UL delay threshold. |  |
| repThreshRp | integer | 0..1 | Unsigned integer identifying a threshold in units of milliseconds for round trip packet delay. It shall be present when the AF requests to report the downlink delay when a delay is exceeding the DL delay threshold. |  |
| waitTime | DurationSec | 0..1 | Indicates the minimum waiting time between subsequent reports. Only applicable when the "repFreq" is set to "EVENT\_TRIGGERED". |  |
| repPeriod | DurationSec | 0..1 | Indicates the time interval between successive reporting. It shall be present when the AF requests to report the delay periodicly. |  |

##### 5.14.2.1.x2 Type: QosMonitoringInformationRm

This type represents a QoS Monitoring Information which is defined in subclause 5.14.2.1.x2 but defined with "nullable: true" property so it can be removed in "JSON Merge Patch", as defined in IETF RFC 7396 [39]. It shall comply with the provisions defined in table 5.14.2.1.x2-1.

Duration and volume are also removable in "JSON Merge Patch".

Table 5.14.2.1.x1-1: Definition of type QosMonitoringInformationRm

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE) |
| reqQosMonParams | array(RequestedQosMonitoringParameter) | 1..N | Indicates the UL packet delay, DL packet delay and/or round trip packet delay between the UE and the UPF is to be monitored when the QoS Monitoring for URLLC is enabled for the service data flow. |  |
| repFreqs | array(ReportingFrequency) | 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 | 0..1 | Unsigned integer identifying a threshold in units of milliseconds for DL packet delay. It shall be present when the AF requests to report the downlink delay when a delay is exceeding the DL delay threshold. |  |
| repThreshUl | integer | 0..1 | Unsigned integer identifying a threshold in units of milliseconds for UL packet delay. It shall be present when the AF requests to report the uplink delay when a delay is exceeding the UL delay threshold. |  |
| repThreshRp | integer | 0..1 | Unsigned integer identifying a threshold in units of milliseconds for round trip packet delay. It shall be present when the AF requests to report the downlink delay when a delay is exceeding the DL delay threshold. |  |
| waitTime | DurationSecRm | 0..1 | Indicates the minimum waiting time between subsequent reports. Only applicable when the "repFreq" is set to "EVENT\_TRIGGERED". |  |
| repPeriod | DurationSecRm | 0..1 | Indicates the time interval between successive reporting. It shall be present when the AF requests to report the delay periodicly. |  |

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

### 5.14.4 Used Features

The table below defines the features applicable to the AsSessionWithQoS API. Those features are negotiated as described in subclause 5.2.7.

Table 5.14.4-1: Features used by AsSessionWithQoS API

|  |  |  |
| --- | --- | --- |
| Feature Number | Feature | Description |
| 1 | Notification\_websocket | The delivery of notifications over Websocket is supported according to subclause 5.2.5.4. This feature requires that the Notification\_test\_event featute is also supported. |
| 2 | Notification\_test\_event | The testing of notifications connections is supported according to subclause 5.2.5.3. |
| 3 | EthAsSessionQoS\_5G | Setting up required QoS for Ethernet UE. This feature may only be supported in 5G. |
| 4 | MacAddressRange\_5G | Indicates the support of a set of MAC addresses with a specific range in the traffic filter. This feature may only be supported in 5G. |
| x | QoSMonitoring\_5G | Indicates the support of QoS Monitoring. This feature may only be supported in 5G. |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".Description: A clear textual description of the feature. |

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

## A.2 Data Types applicable to several APIs

For the purpose of referencing entities in the Open API file defined in this Annex, it shall be assumed that this Open API file is contained in a physical file named "TS29122\_CommonData.yaml".

NOTE: For the purpose of referencing the error status codes in the Open API file defined in this Annex, this Open API file contains all the mandatory status codes as defined in table 5.2.6-1, all the API specific error status codes defined for T8 APIs, in addition, some error status codes not used in the current release of this specification but for the purpose of referencing by other specifications.

openapi: 3.0.0

info:

 title: TS 29.122 Common Data Types

 version: 1.1.0.alpha-1

 description: |

 Data types applicable to several APIs.

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externalDocs:

 description: 3GPP TS 29.122 V16.3.0 T8 reference point for Northbound APIs

 url: 'http://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

paths: {}

components:

 schemas:

 SponsorInformation:

 type: object

 properties:

 sponsorId:

 type: string

 description: It indicates Sponsor ID.

 aspId:

 type: string

 description: It indicates Application Service Provider ID.

 required:

 - sponsorId

 - aspId

 UsageThreshold:

 type: object

 properties:

 duration:

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

 totalVolume:

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

 downlinkVolume:

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

 uplinkVolume:

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

 UsageThresholdRm:

 type: object

 properties:

 duration:

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

 totalVolume:

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

 downlinkVolume:

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

 uplinkVolume:

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

 nullable: true

 TimeWindow:

 type: object

 properties:

 startTime:

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

 stopTime:

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

 required:

 - startTime

 - stopTime

 Acknowledgement:

 type: object

 properties:

 details:

 type: string

 description: A human-readable explanation specific to this successful acknowledgement

 required:

 - details

 NotificationData:

 type: object

 properties:

 transaction:

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

 eventReports:

 type: array

 items:

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

 minItems: 1

 description: Contains the reported event and applicable information

 required:

 - transaction

 - eventReports

 EventReport:

 type: object

 properties:

 event:

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

 accumulatedUsage:

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

 flowIds:

 type: array

 items:

 type: integer

 minItems: 1

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

 qosMonReports:

 type: array

 items:

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

 minItems: 1

 description: Contains the QoS Monitoring Reporting information

 required:

 - event

 AccumulatedUsage:

 type: object

 properties:

 duration:

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

 totalVolume:

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

 downlinkVolume:

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

 uplinkVolume:

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

 FlowInfo:

 type: object

 properties:

 flowId:

 type: integer

 description: Indicates the IP flow.

 flowDescriptions:

 type: array

 items:

 type: string

 description: Indicates the packet filters of the IP flow. Refer to subclause 5.3.8 of 3GPP TS 29.214 for encoding. It shall contain UL and/or DL IP flow description.

 minItems: 1

 maxItems: 2

 required:

 - flowId

 TestNotification:

 type: object

 properties:

 subscription:

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

 required:

 - subscription

 WebsockNotifConfig:

 type: object

 properties:

 websocketUri:

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

 requestWebsocketUri:

 type: boolean

 description: Set by the SCS/AS to indicate that the Websocket delivery is requested.

 LocationArea:

 type: object

 properties:

 cellIds:

 type: array

 items:

 type: string

 minItems: 1

 description: Indicates a list of Cell Global Identities of the user which identifies the cell the UE is registered.

 enodeBIds:

 type: array

 items:

 type: string

 minItems: 1

 description: Indicates a list of eNodeB identities in which the UE is currently located.

 routingAreaIds:

 type: array

 items:

 type: string

 minItems: 1

 description: Identifies a list of Routing Area Identities of the user where the UE is located.

 trackingAreaIds:

 type: array

 items:

 type: string

 minItems: 1

 description: Identifies a list of Tracking Area Identities of the user where the UE is located.

 geographicAreas:

 type: array

 items:

 $ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/GeographicArea'

 minItems: 1

 description: Identifies a list of geographic area of the user where the UE is located.

 civicAddresses:

 type: array

 items:

 $ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/CivicAddress'

 minItems: 1

 description: Identifies a list of civic addresses of the user where the UE is located.

 LocationArea5G:

 type: object

 properties:

 geographicAreas:

 type: array

 items:

 $ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/GeographicArea'

 minItems: 0

 description: Identifies a list of geographic area of the user where the UE is located.

 civicAddresses:

 type: array

 items:

 $ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/CivicAddress'

 minItems: 0

 description: Identifies a list of civic addresses of the user where the UE is located.

 nwAreaInfo:

 $ref: 'TS29554\_Npcf\_BDTPolicyControl.yaml#/components/schemas/NetworkAreaInfo'

 ProblemDetails:

 type: object

 properties:

 type:

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

 title:

 type: string

 description: A short, human-readable summary of the problem type. It should not change from occurrence to occurrence of the problem.

 status:

 type: integer

 description: The HTTP status code for this occurrence of the problem.

 detail:

 type: string

 description: A human-readable explanation specific to this occurrence of the problem.

 instance:

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

 cause:

 type: string

 description: A machine-readable application error cause specific to this occurrence of the problem. This IE should be present and provide application-related error information, if available.

 invalidParams:

 type: array

 items:

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

 minItems: 1

 description: Description of invalid parameters, for a request rejected due to invalid parameters.

 InvalidParam:

 type: object

 properties:

 param:

 type: string

 description: Attribute's name encoded as a JSON Pointer, or header's name.

 reason:

 type: string

 description: A human-readable reason, e.g. "must be a positive integer".

 required:

 - param

 PlmnId:

 type: object

 properties:

 mcc:

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

 mnc:

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

 required:

 - mcc

 - mnc

 ConfigResult:

 type: object

 properties:

 externalIds:

 type: array

 items:

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

 minItems: 1

 description: Each element indicates an external identifier of the UE.

 msisdns:

 type: array

 items:

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

 minItems: 1

 description: Each element identifies the MS internal PSTN/ISDN number allocated for the UE.

 resultReason:

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

 required:

 - resultReason

 oneOf:

 - required: [externalIds]

 - required: [msisdns]

 Bandwidth:

 type: integer

 minimum: 0

 description: integer indicating a bandwidth in bits per second.

 BdtReferenceId:

 type: string

 description: string identifying a BDT Reference ID as defined in subclause 5.3.3 of 3GPP TS 29.154.

 Binary:

 type: string

 description: string with format "binary" as defined in OpenAPI Specification.

 Bytes:

 type: string

 description: String with format "byte" as defined in OpenAPI Specification, i.e, base64-encoded characters.

 DayOfWeek:

 type: integer

 minimum: 1

 maximum: 7

 description: integer between and including 1 and 7 denoting a weekday. 1 shall indicate Monday, and the subsequent weekdays shall be indicated with the next higher numbers. 7 shall indicate Sunday.

 DateTime:

 type: string

 description: string with format "date-time" as defined in OpenAPI.

 DateTimeRm:

 type: string

 description: string with format "date-time" as defined in OpenAPI with "nullable=true" property.

 nullable: true

 DateTimeRo:

 type: string

 description: string with format "date-time" as defined in OpenAPI with "readOnly=true" property.

 readOnly: true

 DurationSec:

 type: integer

 minimum: 0

 description: Unsigned integer identifying a period of time in units of seconds.

 DurationSecRm:

 type: integer

 minimum: 0

 description: Unsigned integer identifying a period of time in units of seconds with "nullable=true" property.

 nullable: true

 DurationSecRo:

 type: integer

 minimum: 0

 description: Unsigned integer identifying a period of time in units of seconds with "readOnly=true" property.

 readOnly: true

 DurationMin:

 type: integer

 format: int32

 minimum: 0

 description: Unsigned integer identifying a period of time in units of minutes.

 ExternalId:

 type: string

 description: string containing a local identifier followed by "@" and a domain identifier. Both the local identifier and the domain identifier shall be encoded as strings that do not contain any "@" characters. See Clause 4.6.2 of 3GPP TS 23.682 for more information.

 ExternalGroupId:

 type: string

 description: string containing a local identifier followed by "@" and a domain identifier. Both the local identifier and the domain identifier shall be encoded as strings that do not contain any "@" characters. See Clauses 4.6.2 and 4.6.3 of 3GPP TS 23.682 for more information.

 Ipv4Addr:

 type: string

 description: string identifying a Ipv4 address formatted in the "dotted decimal" notation as defined in IETF RFC 1166.

 Ipv6Addr:

 type: string

 description: string identifying a Ipv6 address formatted according to clause 4 in IETF RFC 5952. The mixed Ipv4 Ipv6 notation according to clause 5 of IETF RFC 5952 shall not be used.

 Ipv4AddrRo:

 type: string

 description: string identifying a Ipv4 address formatted in the "dotted decimal" notation as defined in IETF RFC 1166, with "readOnly=true" property.

 readOnly: true

 Ipv6AddrRo:

 type: string

 description: string identifying a Ipv6 address formatted according to clause 4 in IETF RFC 5952, with "readOnly=true" property. The mixed Ipv4 Ipv6 notation according to clause 5 of IETF RFC 5952 shall not be used.

 readOnly: true

 Link:

 type: string

 description: string formatted according to IETF RFC 3986 identifying a referenced resource.

 Mcc:

 type: string

 description: String encoding a Mobile Country Code part of the PLMN, comprising 3 digits, as defined in 3GPP TS 38.413.

 Mnc:

 type: string

 description: String encoding a Mobile Network Code part of the PLMN, comprising 2 or 3 digits, as defined in 3GPP TS 38.413.

 Msisdn:

 type: string

 description: string formatted according to subclause 3.3 of 3GPP TS 23.003 that describes an MSISDN.

 Port:

 type: integer

 description: Unsigned integer with valid values between 0 and 65535.

 minimum: 0

 maximum: 65535

 PortRo:

 type: integer

 description: Unsigned integer with valid values between 0 and 65535, with "readOnly=true" property.

 minimum: 0

 maximum: 65535

 readOnly: true

 ResourceId:

 type: string

 description: string chosen by the SCEF to serve as identifier in a resource URI.

 ScsAsId:

 type: string

 description: string that identifies an SCS/AS.

 TimeOfDay:

 type: string

 description: String with format partial-time or full-time as defined in subclause 5.6 of IETF RFC 3339. Examples, 20:15:00, 20:15:00-08:00 (for 8 hours behind UTC).

 Uri:

 type: string

 description: string providing an URI formatted according to IETF RFC 3986.

 Volume:

 type: integer

 format: int64

 minimum: 0

 description: Unsigned integer identifying a volume in units of bytes.

 VolumeRm:

 type: integer

 format: int64

 minimum: 0

 description: Unsigned integer identifying a volume in units of bytes with "nullable=true" property.

 nullable: true

 Event:

 anyOf:

 - type: string

 enum:

 - SESSION\_TERMINATION

 - LOSS\_OF\_BEARER

 - RECOVERY\_OF\_BEARER

 - RELEASE\_OF\_BEARER

 - USAGE\_REPORT

 - FAILED\_RESOURCES\_ALLOCATION

 - 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: >

 Possible values are

 - SESSION\_TERMINATION: Indicates that Rx session is terminated.

 - LOSS\_OF\_BEARER : Indicates a loss of a bearer.

 - RECOVERY\_OF\_BEARER: Indicates a recovery of a bearer.

 - RELEASE\_OF\_BEARER: Indicates a release of a bearer.

 - USAGE\_REPORT: Indicates the usage report event.

 - FAILED\_RESOURCES\_ALLOCATION: Indicates the resource allocation is failed.

 ResultReason:

 anyOf:

 - type: string

 enum:

 - ROAMING\_NOT\_ALLOWED

 - OTHER\_REASON

 - type: string

 description: >

 This string provides a failure reason.

 description: >

 Possible values are

 - ROAMING\_NOT\_ALLOWED: Identifies the configuration parameters are not allowed by roaming agreement.

 - OTHER\_REASON: Identifies the configuration parameters are not configured due to other reason.

#

# HTTP responses

#

 responses:

 '400':

 description: Bad request

 content:

 application/problem+json:

 schema:

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

 '401':

 description: Unauthorized

 content:

 application/problem+json:

 schema:

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

 '403':

 description: Forbidden

 content:

 application/problem+json:

 schema:

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

 '404':

 description: Not Found

 content:

 application/problem+json:

 schema:

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

 '406':

 description: Not Acceptable

 content:

 application/problem+json:

 schema:

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

 '409':

 description: Conflict

 content:

 application/problem+json:

 schema:

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

 '411':

 description: Length Required

 content:

 application/problem+json:

 schema:

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

 '412':

 description: Precondition Failed

 content:

 application/problem+json:

 schema:

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

 '413':

 description: Payload Too Large

 content:

 application/problem+json:

 schema:

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

 '414':

 description: URI Too Long

 content:

 application/problem+json:

 schema:

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

 '415':

 description: Unsupported Media Type

 content:

 application/problem+json:

 schema:

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

 '429':

 description: Too Many Requests

 content:

 application/problem+json:

 schema:

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

 '500':

 description: Internal Server Error

 content:

 application/problem+json:

 schema:

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

 '503':

 description: Service Unavailable

 content:

 application/problem+json:

 schema:

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

 default:

 description: Generic Error

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

## A.14 AsSessionWithQoS API

openapi: 3.0.0

info:

 title: 3gpp-as-session-with-qos

 version: 1.1.0.alpha-1

 description: |

 API for setting us an AS session with required QoS.

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externalDocs:

 description: 3GPP TS 29.122 V16.3.0 T8 reference point for Northbound APIs

 url: 'http://www.3gpp.org/ftp/Specs/archive/29\_series/29.122/'

security:

 - {}

 - oAuth2ClientCredentials: []

servers:

 - url: '{apiRoot}/3gpp-as-session-with-qos/v1'

 variables:

 apiRoot:

 default: https://example.com

 description: apiRoot as defined in subclause 5.2.4 of 3GPP TS 29.122.

paths:

 /{scsAsId}/subscriptions:

 get:

 summary: read all of the active subscriptions for the SCS/AS

 tags:

 - AsSessionWithQoS API SCS/AS level GET Operation

 parameters:

 - name: scsAsId

 in: path

 description: Identifier of the SCS/AS

 required: true

 schema:

 type: string

 responses:

 '200':

 description: OK.

 content:

 application/json:

 schema:

 type: array

 items:

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

 '400':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/404'

 '406':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/406'

 '429':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/500'

 '503':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29122\_CommonData.yaml#/components/responses/default'

 post:

 summary: Creates a new subscription resource

 tags:

 - AsSessionWithQoS API Subscription level POST Operation

 parameters:

 - name: scsAsId

 in: path

 description: Identifier of the SCS/AS

 required: true

 schema:

 type: string

 requestBody:

 description: Request to create a new subscription resource

 required: true

 content:

 application/json:

 schema:

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

 callbacks:

 notificationDestination:

 '{request.body#/notificationDestination}':

 post:

 requestBody: # contents of the callback message

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '204':

 description: No Content (successful notification)

 '400':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/404'

 '411':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/415'

 '429':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/500'

 '503':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29122\_CommonData.yaml#/components/responses/default'

 responses:

 '201':

 description: Created (Successful creation of subscription)

 content:

 application/json:

 schema:

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

 headers:

 Location:

 description: 'Contains the URI of the newly created resource'

 required: true

 schema:

 type: string

 '400':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/404'

 '411':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/415'

 '429':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/500'

 '503':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29122\_CommonData.yaml#/components/responses/default'

 /{scsAsId}/subscriptions/{subscriptionId}:

 get:

 summary: read an active subscriptions for the SCS/AS and the subscription Id

 tags:

 - AsSessionWithQoS API Subscription level GET Operation

 parameters:

 - name: scsAsId

 in: path

 description: Identifier of the SCS/AS

 required: true

 schema:

 type: string

 - name: subscriptionId

 in: path

 description: Identifier of the subscription resource

 required: true

 schema:

 type: string

 responses:

 '200':

 description: OK (Successful get the active subscription)

 content:

 application/json:

 schema:

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

 '400':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/404'

 '406':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/406'

 '429':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/500'

 '503':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29122\_CommonData.yaml#/components/responses/default'

 put:

 summary: Updates/replaces an existing subscription resource

 tags:

 - AsSessionWithQoS API subscription level PUT Operation

 parameters:

 - name: scsAsId

 in: path

 description: Identifier of the SCS/AS

 required: true

 schema:

 type: string

 - name: subscriptionId

 in: path

 description: Identifier of the subscription resource

 required: true

 schema:

 type: string

 requestBody:

 description: Parameters to update/replace the existing subscription

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '200':

 description: OK (Successful update of the subscription)

 content:

 application/json:

 schema:

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

 '400':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/404'

 '411':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/415'

 '429':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/500'

 '503':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29122\_CommonData.yaml#/components/responses/default'

 patch:

 summary: Updates/replaces an existing subscription resource

 tags:

 - AsSessionWithQoS API subscription level PATCH Operation

 parameters:

 - name: scsAsId

 in: path

 description: Identifier of the SCS/AS

 required: true

 schema:

 type: string

 - name: subscriptionId

 in: path

 description: Identifier of the subscription resource

 required: true

 schema:

 type: string

 requestBody:

 required: true

 content:

 application/merge-patch+json:

 schema:

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

 responses:

 '200':

 description: OK. The subscription was modified successfully.

 content:

 application/json:

 schema:

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

 '400':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/404'

 '411':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/415'

 '429':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/500'

 '503':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29122\_CommonData.yaml#/components/responses/default'

 delete:

 summary: Deletes an already existing subscription

 tags:

 - AsSessionWithQoS API Subscription level DELETE Operation

 parameters:

 - name: scsAsId

 in: path

 description: Identifier of the SCS/AS

 required: true

 schema:

 type: string

 - name: subscriptionId

 in: path

 description: Identifier of the subscription resource

 required: true

 schema:

 type: string

 responses:

 '204':

 description: No Content (Successful deletion of the existing subscription)

 '400':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/404'

 '429':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/500'

 '503':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29122\_CommonData.yaml#/components/responses/default'

components:

 securitySchemes:

 oAuth2ClientCredentials:

 type: oauth2

 flows:

 clientCredentials:

 tokenUrl: '{tokenUrl}'

 scopes: {}

 schemas:

 AsSessionWithQoSSubscription:

 type: object

 properties:

 self:

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

 supportedFeatures:

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

 notificationDestination:

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

 flowInfo:

 type: array

 items:

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

 minItems: 1

 description: Describe the data flow which requires QoS.

 ethFlowInfo:

 type: array

 items:

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

 minItems: 1

 description: Identifies Ethernet packet flows.

 qosReference:

 type: string

 description: Identifies a pre-defined QoS information

 ueIpv4Addr:

 $ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv4Addr'

 ueIpv6Addr:

 $ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv6Addr'

 macAddr:

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

 usageThreshold:

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

 sponsorInfo:

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

 qosMonInfo:

 $ref: '#/components/schemas/QosMonitoringInformation' requestTestNotification:

 type: boolean

 description: Set to true by the SCS/AS to request the SCEF to send a test notification as defined in subclause 5.2.5.3. Set to false or omitted otherwise.

 websockNotifConfig:

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

 required:

 - notificationDestination

 AsSessionWithQoSSubscriptionPatch:

 type: object

 properties:

 flowInfo:

 type: array

 items:

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

 minItems: 1

 description: Describe the data flow which requires QoS.

 ethFlowInfo:

 type: array

 items:

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

 minItems: 1

 description: Identifies Ethernet packet flows.

 qosReference:

 type: string

 description: Pre-defined QoS reference

 usageThreshold:

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

 qosMonInfo:

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

 QosMonitoringInformation:

 type: object

 properties:

 reqQosMonParams:

 type: array

 items:

 $ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/'RequestedQosMonitoringParameter'

 minItems: 1

 repFreqs:

 type: array

 items:

 $ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/'ReportingFrequency'

 minItems: 1

 repThreshDl:

 type: integer

 repThreshUl:

 type: integer

 repThreshRp:

 type: integer

 repPeriod:

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

 QosMonitoringInformationRm:

 type: object

 properties:

 reqQosMonParams:

 type: array

 items:

 $ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/'RequestedQosMonitoringParameter'

 minItems: 1

 repFreqs:

 type: array

 items:

 $ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/'ReportingFrequency'

 minItems: 1

 repThreshDl:

 type: integer

 nullable: true

 repThreshUl:

 type: integer

 nullable: true

 repThreshRp:

 type: integer

 nullable: true

 repPeriod:

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

\*\*\* End of Change \*\*\*