**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** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***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 can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***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 \*\*\*