**3GPP TSG-CT WG3 Meeting #108eC3-201261**

**E-Meeting, 19th – 28th February 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.122** | **CR** | **0228** | **rev** | **1** | **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)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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|  | | | | | | | | | | |
| ***Title:*** | Supporting the MT-LR via NEF | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | CATT | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_eLCS | | | | |  | ***Date:*** | | | 2020-1-19 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | NEF is capable of securely exposing the network events provided by 3GPP NFs to AF via Nnef\_EventExposure service. Location reporting is considered as one of the monitoring events exposed to AF. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Complement the necessary IEs to support Location Reporting monitoring event for 5G in the Nnef\_EventExposure service and service operations; 2. Revise the yaml file to align with the changes on data types | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Missing the Location Reporting IE used to MT-LR by AF defined in Stage 2. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 5.3.2.1.1, 5.3.2.1.2, 5.3.2.3.2, 5.3.2.3.5, 5.3.2.3.x, 5.3.2.4.3,.5.3.4, 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 includes a backwards compatible feature to the OpenAPI file | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*The start of changes\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.682: "Architecture enhancements to facilitate communications with packet data networks and applications".

[3] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)".

[4] IETF RFC 5246, "The Transport Layer Security (TLS) Protocol Version 1.2".

[5] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

[6] Hypertext Transfer Protocol (HTTP) Status Code Registry at IANA, <http://www.iana.org/assignments/http-status-codes>.

[7] IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax".

[8] IETF RFC 7807: "Problem Details for HTTP APIs".

[9] 3GPP TS 29.154: "Service capability exposure functionality over Nt reference point".

[10] 3GPP TS 29.214: "Policy and Charging Control over Rx reference point".

[11] 3GPP TS 29.336: "Home Subscriber Server (HSS) diameter interfaces for interworking with packet data networks and applications".

[12] 3GPP TS 29.128: "Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) interfaces for interworking with packet data networks and applications".

[13] 3GPP TS 29.201: "Representational State Transfer (REST) reference point between Application Function (AF) and Protocol Converter (PC)".

[14] 3GPP TS 23.003: "Numbering, addressing and identification".

[15] IETF RFC 3339: "Date and Time on the Internet: Timestamps".

[16] IETF RFC 7230: "Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing".

[17] IETF RFC 7231: "Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content".

[18] IETF RFC 7232: "Hypertext Transfer Protocol (HTTP/1.1): Conditional Requests".

[19] IETF RFC 7233: "Hypertext Transfer Protocol (HTTP/1.1): Range Requests".

[20] IETF RFC 7234: "Hypertext Transfer Protocol (HTTP/1.1): Caching".

[21] IETF RFC 7235: "Hypertext Transfer Protocol (HTTP/1.1): Authentication".

[22] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".

[23] 3GPP TS 29.155: "Traffic steering control; Representational state transfer (REST) over St reference point".

[24] 3GPP TS 29.368: "Tsp interface protocol between the MTC Interworking Function (MTC-IWF) and Service Capability Server (SCS)".

[25] 3GPP TS 29.337: "Diameter-based T4 interface for communications with packet data networks and applications".

[26] 3GPP TS 29.250: "Nu reference point between SCEF and PFDF for sponsored data connectivity".

[27] Open API Initiative, "OpenAPI 3.0.0 Specification", <https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.0.md>.

[28] IETF RFC 1166: "Internet Numbers".

[29] IETF RFC 5952: "A recommendation for Ipv6 address text representation".

[30] 3GPP TS 29.153: "Service capability exposure functionality over Ns reference point".

[31] 3GPP TS 24.250: "Protocol for Reliable Data Service; Stage 3".

[32] IETF RFC 6455: "The Websocket Protocol".

[33] 3GPP TS 29.272: "Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol".

[34] 3GPP TS 29.338: "Diameter based protocols to support Short Message Service (SMS) capable Mobile Management Entities (MMEs)".

[35] 3GPP TS 33.187: "Security aspects of Machine-Type Communications (MTC) and other mobile data applications communications enhancements".

[36] 3GPP TS 29.468: "Group Communication System Enablers for LTE (GCSE\_LTE);MB2 Reference Point;Stage 3".

[37] 3GPP TS 29.116: "Presentational state transfer over xMB reference point between Content Provider and BM-SC".

[38] IETF RFC 5789: "PATCH method for HTTP".

[39] IETF RFC 7396: "JSON Merge Patch".

[40] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

[41] YAML (10/2009): "YAML Ain't Markup Language (YAML™) Version 1.2", <http://www.yaml.org/spec/1.2/spec.html>.

[42] 3GPP TS 29.572: "5G System; Location Management Services; Stage 3".

[43] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".

[44] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[45] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces Stage 3".

[46] IETF RFC 6733: "Diameter Base Protocol".

[47] 3GPP TS 23.222: "Common API Framework for 3GPP Northbound APIs; Stage 2".

[48] 3GPP TS 29.222: "Common API Framework for 3GPP Northbound APIs; Stage 3".

[49] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[50] 3GPP TS 29.554: "5G System; Background Data Transfer Policy Control Service; Stage 3".

[51] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".

[52] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".

[53] 3GPP TS 33.122: "Security Aspects of Common API Framework for 3GPP Northbound APIs".

[54] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".

[55] 3GPP TS 23.468: "Group Communication System Enablers for LTE (GCSE\_LTE); stage 2".

[56] 3GPP TS 26.348, "Northbound Application Programming Interface (API) for Multimedia Broadcast/Multicast Service (MBMS) at the xMB reference point".

[57] 3GPP TS 29.508: "5G System; Session Management Event Exposure Service; Stage 3".

[58] 3GPP TR 21.900: "Technical Specification Group working methods".

[59] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA) Radio Resource Control (RRC); Protocol Specification".

[60] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) protocol specification".

[61] 3GPP TS 29.675: "User Equipment (UE) radio capability provisioning service; Stage 3".

[62] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".

[xx] ITU Recommendation E.164: "The international public telecommunication numbering plan".

[yy] 3GPP TS 29.515: "5G System; Gateway Mobile Location Services; Stage 3".

[zz] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Next change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

##### 5.3.2.1.1 Introduction

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

Table 5.3.2.1.1-1 specifies data types re-used by the MonitoringEvent API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the MonitoringEvent API.

Table 5.3.2.1.1-1: MonitoringEvent API re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| DddStatus | 3GPP TS 29.508 [57] | Traffic Descriptor of source of downlink data notifications. |
| DddTrafficDescriptor | 3GPP TS 29.508 [57] | Traffic Descriptor of source of downlink data. |
| GeographicArea | 3GPP TS 29.572 [42] | Identifies the geographical information of the user(s). |
| CivicAddress | 3GPP TS 29.572 [42] | Identifies the civic address information of the user(s). |
| LocationQoS | 3GPP TS 29.572 [42] | Requested location QoS including accuracy, response time and LCS QoS Class |
| LdrType | 3GPP TS 29.572 [42] | Location deferred requested event type |
| LcsServiceType | 3GPP TS 29.572 [42] | The LCS service type |
| VelocityRequested | 3GPP TS 29.572 [42] | Velocity of the target UE requested |
| LcsPriority | 3GPP TS 29.572 [42] | Priority of the location request |
| AgeOfLocationEstimate | 3GPP TS 29.572 [42] | Age of the locatin estimate |
| AccuracyFulfilmentIndicator | 3GPP TS 29.572 [42] | The indication whether the obtained location estimate satisfies the requested accuracy or not |
| VelocityEstimate | 3GPP TS 29.572 [42] | Responsed UE velocity, if requested and available |
| PositioningMethodAndUsage | 3GPP TS 29.572 [42] | If present, this IE shall indicate the usage of each non-GANSS positioning method that was attempted to determine the location estimate, either successfully or unsuccessfully. |
| GnssPositioningMethodAndUsage | 3GPP TS 29.572 [42] | If present, this IE shall indicate the usage of each GANSS positioning method that was attempted to determine the location estimate, either successfully or unsuccessfully. |
| LdrReference | 3GPP TS 29.572 [42] | LDR Reference Number |
| TerminationCause | 3GPP TS 29.572 [42] | The IE shall be included if event reporting has been terminated |
| NetworkAreaInfo | 3GPP TS 29.554 [50] | Identifies a network area information. |
| SupportedFeatures | 3GPP TS 29.571 [45] | Used to negotiate the applicability of the optional features defined in table 5.3.4-1. |
| PseudonymOfUE | 3GPP TS 29.515 [yy] | Pseudonym of the target UE |
| ExternalClientType | 3GPP TS 29.515 [yy] | External client type |
| SupportedGADShapes | 3GPP TS 29.515 [yy] | Supported Geographical Area Description shapes |
| ServiceIdentiy | 3GPP TS 29.515 [yy] | Service identity |
| CodeWord | 3GPP TS 29.515 [yy] | Code word |
| E164CountryCode OfGeographicArea | 3GPP TS 29.515 [yy] | the combination of one, two or three digits identifying a specific country, countries in an integrated numbering plan, or a specific geographic area |
| LocationTypeRequested | 3GPP TS 29.515 [yy] | the location type requested by the LCS client indicating requesting current location,current or last known location, or initial location |
| OccurrenceInfo | 3GPP TS 29.572 [42] | One time only report indication |
| LinearDistance | 3GPP TS 29.572 [42] | This IE shall be present and set to true if a location estimate is required for each event report. |

Editor´s note: Stage 2 clarifications are required whether multiple traffic filters and ethernet traffic descriptors are permissable. The Encoding of the DddTrafficDescriptor is also FFS (reuse of TS 29.523 data types EthernetFlowInfo, IpFlowInfo?).

Editor´s note: The location monitoring details in 5G\_eLCS about applicable data for event configuration and report is FFS

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Next change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

##### 5.3.2.1.2 Type: MonitoringEventSubscription

This type represents a subscription to monitoring an event. The same structure is used in the subscription request and subscription response.

Table 5.3.2.1.2-1: Definition of type MonitoringEventSubscription

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 3) |
| Self | Link | 0..1 | Link to the resource "Individual Monitoring Event 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. |  |
| mtcProviderId | string | 0..1 | Identifies the MTC Service Provider and/or MTC Application. (NOTE 7) |  |
| externalId | ExternalId | 0..1 | Identifies a user as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE 1) | (NOTE 5) |
| Msisdn | Msisdn | 0..1 | Identifies the MS internal PSTN/ISDN number allocated for a UE.  (NOTE 1) | (NOTE 5) |
| externalGroupId | ExternalGroupId | 0..1 | Identifies a user group as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE 1) (NOTE 6) |  |
| addExtGroupIds | array(ExternalGroupId) | 0..N | Identifies user groups as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE 1) (NOTE 6) | Number\_of\_UEs\_in\_an\_area\_notification, Number\_of\_UEs\_in\_an\_area\_notification\_5G |
| ipv4Addr | Ipv4Addr | 0..1 | Identifies the Ipv4 address.  (NOTE 1) | Location\_notification,  Communication\_failure\_notification |
| ipv6Addr | Ipv6Addr | 0..1 | Identifies the Ipv6 address.  (NOTE 1) | Location\_notification,  Communication\_failure\_notification |
| notificationDestination | Link | 1 | An URI of a notification destination that T8 message shall be delivered to. |  |
| 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 |
| monitoringType | MonitoringType | 1 | Enumeration of monitoring type. Refer to clause 5.3.2.4.3. |  |
| maximumNumberOfReports | integer | 0..1 | Identifies the maximum number of event reports to be generated by the HSS, MME/SGSN as specified in subclause 5.6.0 of 3GPP TS 23.682 [2].  (NOTE 2) | Location\_notification\_5G |
| monitorExpireTime | DateTime | 0..1 | Identifies the absolute time at which the related monitoring event request is considered to expire, as specified in subclause 5.6.0 of 3GPP TS 23.682 [2].  (NOTE 2) | Location\_notification\_5G |
| groupReportGuardTime | DurationSec | 0..1 | Identifies the time for which the SCEF can aggregate the monitoring event reports detected by the UEs in a group and report them together to the SCS/AS, as specified in subclause 5.6.0 of 3GPP TS 23.682 [2]. |  |
| maximumDetectionTime | DurationSec | 0..1 | If "monitoringType" is "LOSS\_OF\_CONNECTIVITY", this parameter may be included to identify the maximum period of time after which the UE is considered to be unreachable. | Loss\_of\_connectivity\_notification |
| reachabilityType | ReachabilityType | 0..1 | If "monitoringType" is "UE\_REACHABILITY", this parameter shall be included to identify whether the request is for "Reachability for SMS" or "Reachability for Data". | Ue-reachability\_notification |
| maximumLatency | DurationSec | 0..1 | If "monitoringType" is "UE\_REACHABILITY", this parameter may be included to identify the maximum delay acceptable for downlink data transfers. | Ue-reachability\_notification |
| maximumResponseTime | DurationSec | 0..1 | If "monitoringType" is "UE\_REACHABILITY", this parameter may be included to identify the length of time for which the UE stays reachable to allow the SCS/AS to reliably deliver the required downlink data. | Ue-reachability\_notification |
| suggestedNumberOfDlPackets | integer | 0..1 | If "monitoringType" is "UE\_REACHABILITY", this parameter may be included to identify the number of packets that the serving gateway shall buffer in case that the UE is not reachable. | Ue-reachability-notification |
| idleStatusIndication | boolean | 0..1 | If "monitoringType" is set to "UE\_REACHABILITY" or "AVAILABILITY\_AFTER\_DDN\_FAILURE", this parameter may be included to indicate the notification of when a UE, for which PSM is enabled, transitions into idle mode.  - "true": indicate enabling of notification  - "false": indicate no need to notify  Default: "false". | Ue-reachability\_notification,  Availability\_after\_DDN\_failure\_notification,  Availability\_after\_DDN\_failure\_notification\_enhancement |
| locationType | LocationType | 0..1 | If "monitoringType" is "LOCATION\_REPORTING" or "NUMBER\_OF\_UES\_IN\_AN\_AREA", this parameter shall be included to identify whether the request is for Current Location or Last known Location.  (NOTE 4) | Location\_notification, Number\_of\_UEs\_in\_an\_area\_notification, Number\_of\_UEs\_in\_an\_area\_notification\_5G |
| Accuracy | Accuracy | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to identify the desired level of accuracy of the requested location information, as described in subclause 4.9.2 of 3GPP TS 23.682 [2]. | Location\_notification,  Location\_notification\_5G |
| minimumReportInterval | DurationSec | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to identify a minimum time interval between Location Reporting notifications. | Location\_notification,  Location\_notification\_5G |
| maxmumReportInterval | DurationSec | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to identify a maximum time interval between Location Reporting notifications. | Location\_notification\_5G |
| samplingInterval | DurationSec | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to identify the maximum time interval between consecutive evaluations by a UE of a trigger event. | Location\_notification\_5G |
| occurrenceInfo | OccurrenceInfo | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to indicate only one time report. | Location\_notification\_5G |
| reportingDuration | DurationSec | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to identify the maximum duration of event reporting. | Location\_notification\_5G |
| reportingLocationReq | boolean | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included and set to true for event reporting requiring the location estimate. | Location\_notification\_5G |
| linearDistance | LinearDistance | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to indicate the minimum linear(straight line) distance for motion event reportd. | Location\_notification\_5G |
| associationType | AssociationType | 0..1 | If "monitoringType" is "CHANGE\_OF\_IMSI\_IMEI\_ASSOCIATION", this parameter shall be included to identify whether the change of IMSI-IMEI or IMSI-IMEISV association shall be detected. | Change\_of\_IMSI\_IMEI\_association\_notification |
| plmnIndication | boolean | 0..1 | If "monitoringType" is "ROAMING\_STATUS", this parameter may be included to indicate the notification of UE's Serving PLMN ID.  - "true": The value shall be used to indicate enabling of notification;  - "false": The value shall be used to indicate disabling of notification.  Default: "false". | Roaming\_status\_notification |
| locationArea | LocationArea | 0..1 | If "monitoringType" is "NUMBER\_OF\_UES\_IN\_AN\_AREA", this parameter may be included to indicate the area within which the SCS/AS requests the number of UEs. | Number\_of\_UEs\_in\_an\_area\_notification |
| locationArea5G | LocationArea5G | 0..1 | If "monitoringType" is "NUMBER\_OF\_UES\_IN\_AN\_AREA", this parameter may be included to indicate the area within which the AF requests the number of UEs.  If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to indicate the area within which the AF requests the area event of the target UE. | Number\_of\_UEs\_in\_an\_area\_notification\_5G,  Location\_notification\_5G |
| dddTraDes | DddTrafficDescriptor | 0..1 | The traffic descriptor of the downlink data source. May be included for event "DOWNLINK\_DATA\_DELIVERY\_STATUS" or "AVAILABILITY\_AFTER\_DDN\_FAILURE". | Downlink\_data\_delivery\_status\_5G,  Availability\_after\_DDN\_failure\_notification\_enhancement |
| dddStati | array(DddStatus) | 0..N | May be included for event "DOWNLINK\_DATA\_DELIVERY\_STATUS". The subscribed stati (delivered, transmitted, buffered) for the event. If omitted all stati are subscribed. | Downlink\_data\_delivery\_status\_5G |
| monitoringEventReport | MonitoringEventReport | 0..1 | Identifies a monitoring event report which is sent from the SCEF to the SCS/AS. |  |
| apiNames | array(string) | 0..N | If "monitoringType" is "API\_SUPPORT\_CAPABILITY", this parameter may be included. Each element identifies the name of an API.  It shall set as {apiName} part of the URI structure for each T8 or N33 API as defined in the present specification or 3GPP TS 29.522 [62], respectively.  This allows the SCS/AS to request the capability change for its interested APIs. If it is omitted, the SCS/AS requests to be notified for capability change for all APIs the SCEF+NEF supports. | API\_support\_capability\_notification |
| pseudonymOfUe | PseudonymOfUe | 0..1 | Pseudonym of the target UE.  (NOTE 1) | Location\_notification\_5G |
| externalClientType | ExternalClientType | 0..1 | External client type.  (NOTE 1) | Location\_notification\_5G |
| locationQoS | LocationQoS | 0..1 | Requested location QoS.  (NOTE 8) | Location\_notification\_5G |
| supportedGADShapes | array(SupportedGADShapes) | 0..N | Supported Geographical Area Description shapes. | Location\_notification\_5G |
| serviceIdentity | ServiceIdentity | 0..1 | Service identity. | Location\_notification\_5G |
| codeWord | CodeWord | 0..1 | codeword. | Location\_notification\_5G |
| serviceCoverage | array(E164CountryCode OfGeographicArea) | 0..1 | a list of E.164 country codes for geographic areas [xx] where the LCS client is permitted to request and receive UE location information. | Location\_notification\_5G |
| ldrType | LdrType | 0..1 | Location deferred requested event type. | Location\_notification\_5G |
| lcsServiceType | LcsServiceType | 0..1 | The LCS service type. | Location\_notification\_5G |
| velocityRequested | VelocityRequested | 0..1 | Velocity of the target UE requested. | Location\_notification\_5G |
| priority | LcsPriority | 0..1 | Priority of the location request. | Location\_notification\_5G |
| maximumAgeOfLocationEstimate | AgeOfLocationEstimate | 0..1 | Requested maximum age of the locatin estimate. | Location\_notification\_5G |
| locationTypeRequested | LocationTypeRequested | 0..1 | the location type requested by the LCS client indicating requesting current location,current or last known location, or initial location. | Location\_notification\_5G |
| NOTE 1: One of the properties "externalId", "msisdn", "ipv4Addr", "ipv6Addr" or "externalGroupId" shall be included for features "Location\_notification" and "Communication\_failure\_notification";. "ipv4Addr" or "ipv6Addr" is required for monitoring via the PCRF for an individual UE. One of the properties "externalId", "msisdn" or "externalGroupId" shall be included for features "Pdn\_connectivity\_status", "Loss\_of\_connectivity\_notification", "Ue-reachability\_notification", "Change\_of\_IMSI\_IMEI\_association\_notification", "Roaming\_status\_notification", "Availability\_after\_DDN\_failure\_notification" and "Availability\_after\_DDN\_failure\_notification\_enhancement". One of the properties "externalId", "msisdn", "ipv4Addr", "ipv6Addr", "externalGroupId", or "pseudonymOfUe "shall be included for features "Location\_notification\_5G".NOTE 2: Inclusion of either "maximumNumberOfReports" (with a value higher than 1) or "monitorExpireTime" makes the Monitoring Request a Continuous Monitoring Request, where the SCEF sends Notifications until either the maximum number of reports or the monitoring duration indicated by the property "monitorExpireTime" is exceeded. The "maximumNumberOfReports" with a value 1 makes the Monitoring Request a One-time Monitoring Request. At least one of "maximumNumberOfReports" or "monitorExpireTime" shall be provided.  NOTE 3: Properties marked with a feature as defined in subclause 5.3.4 are applicable as described in subclause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 4: In this release, for features "Number\_of\_UEs\_in\_an\_area\_notification" and "Number\_of\_UEs\_in\_an\_area\_notification\_5G", locationType shall be set to "LAST\_KNOWN\_LOCATION".  NOTE 5: The property does not apply for the features "Number\_of\_UEs\_in\_an\_area\_notification" and "Number\_of\_UEs\_in\_an\_area\_notification\_5G".  NOTE 6: For the features "Number\_of\_UEs\_in\_an\_area\_notification" and "Number\_of\_UEs\_in\_an\_area\_notification\_5G", the property "externalGroupId" may be included for single group and "addExtGroupIds" may be included for multiple groups but not both.  NOTE 7: The SCEF should check received MTC provider identifier and then the SCEF may:  - override it with local configured value and send it to HSS; - send it directly to the HSS; or - reject the monitoring configuration request.  NOTE 8: The IE only may be included if the accuracy of location exceeds cell ID. | | | | |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Next change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

##### 5.3.2.3.2 Type: MonitoringEventReport

This data type represents a monitoring event notification which is sent from the SCEF to the SCS/AS.

Table 5.3.2.3.2-1: Definition of type MonitoringEventReport

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description | Applicability (NOTE 1) |
| imeiChange | AssociationType | 0..1 | If "monitoringType" is "CHANGE\_OF\_IMSI\_IMEI\_ASSOCIATION", this parameter shall be included to identify the event of change of IMSI-IMEI or IMSI-IMEISV association is detected.  Refer to 3GPP TS 29.336 [11] Subclause 8.4.22. | Change\_of\_IMSI\_IMEI\_association\_notification |
| externalId | ExternalId | 0..1 | External identifier  (NOTE 2) |  |
| idleStatusInfo | IdleStatusInfo | 0..1 | If "idleStatusIndication" in the "MonitoringEventSubscription"sets to "true", this parameter shall be included to indicate the information when the UE transitions into idle mode. | Ue-reachability\_notification,  Availability\_after\_DDN\_failure\_notification |
| locationInfo | LocationInfo | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter shall be included to indicate the user location related information. | Location\_notification,  Location\_notification\_5G |
| lossOfConnectReason | integer | 0..1 | If "monitoringType" is "LOSS\_OF\_CONNECTIVITY", this parameter shall be included if available to identify the reason why loss of connectivity is reported.  Refer to 3GPP TS 29.336 [11] Subclause 8.4.58. | Loss\_of\_connectivity\_notification |
| maxUEAvailabilityTime | DateTime | 0..1 | If "monitoringType" is "UE\_REACHABILITY", this parameter may be included to identify the timestamp until which a UE using a power saving mechanism is expected to be reachable for SM delivery.  Refer to Subclause 5.3.3.22 of 3GPP TS 29.338 [34]. | Ue-reachability\_notification |
| msisdn | Msisdn | 0..1 | Identifies the MS internal PSTN/ISDN number  (NOTE 2) |  |
| monitoringType | MonitoringType | 1 | Identifies the type of monitoring type as defined in clause 5.3.2.4.3. |  |
| uePerLocationReport | UePerLocationReport | 0..1 | If "monitoringType" is "NUMBER\_OF\_UES\_IN\_AN\_AREA", this parameter shall be included to indicate the number of UEs found at the location. | Number\_of\_UEs\_in\_an\_area\_notification, Number\_of\_UEs\_in\_an\_area\_notification\_5G |
| plmnId | PlmnId | 0..1 | If "monitoringType" is "ROAMING\_STATUS" and "plmnIIndication" in the "MonitoringEventSubscription" sets to "true", this parameter shall be included to indicate the UE's serving PLMN. | Roaming\_status\_notification |
| reachabilityType | ReachabilityType | 0..1 | If "monitoringType" is "UE\_REACHABILITY", this parameter shall be included to identify the reachability of the UE.  Refer to 3GPP TS 29.336 [11] Subclause 8.4.20. | Ue-reachability\_notification |
| roamingStatus | boolean | 0..1 | If "monitoringType" is "ROAMING\_STATUS", this parameter shall be set to "true" if the UE is on roaming status. Set to false or omitted otherwise. | Roaming\_status\_notification |
| failureCause | FailureCause | 0..1 | If "monitoringType" is "COMMUNICATION\_FAILURE", this parameter shall be included to indicate the reason of communication failure. | Communication\_failure\_notification |
| eventTime | DateTime | 0..1 | Identifies when the event is detected or received.  Shall be included for each group of UEs. |  |
| pdnConnInfo | PdnConnectionInformation | 0..1 | If "monitoringType" is "PDN\_CONNECTIVITY\_STATUS", this parameter shall be included to indicate the PDN connection details. | Pdn\_connectivity\_status |
| dddStatus | DddStatus | 0..1 | If "monitoringType" is "DOWNLINK\_DATA\_DELIVERY\_STATUS", this parameter may be include to identify the downlink data delivery status detected by the network. | Downlink\_data\_delivery\_status\_5G |
| maxWaitTime | DateTime | 0..1 | If "monitoringType" is "DOWNLINK\_DATA\_DELIVERY\_STATUS", this parameter may be include to identify the time before which the data will be buffered. | Downlink\_data\_delivery\_status\_5G |
| apiCaps | array(ApiCapabilityInfo) | 0..N | If "monitoringType" is "API\_SUPPORT\_CAPABILITY", this parameter shall be included to indicate the availability of all APIs supported by the serving network. | API\_support\_capability\_notification |
| NOTE 1: Properties marked with a feature as defined in subclause 5.3.4 are applicable as described in subclause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: Identifies the user for which the event occurred. At least one of the properties shall be included. | | | | |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Next change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

5.3.2.3.5 Type: LocationInfo

This data type represents the user location information which is sent from the SCEF to the SCS/AS.

**Table 5.3.2.3.5-1: Definition of LocationInfo data Type**

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute name** | **Data type** | **Cardinality** | **Description** |
| ageOfLocationInfo | DurationMin | 0..1 | Indicates the elapsed time since the last network contact of the UE.  Refer to 3GPP TS 29.272 [33]. |
| cellId | string | 0..1 | Indicates the Cell Global Identification of the user which identifies the cell the UE is registered. |
| enodeBId | string | 0..1 | Indicates the eNodeB in which the UE is currently located. |
| routingAreaId | string | 0..1 | Identifies the Routing Area Identity of the user where the UE is located. |
| trackingAreaId | string | 0..1 | Identifies the Tracking Area Identity of the user where the UE is located. |
| plmnId | string | 0..1 | Identifies the PLMN Identity of the user where the UE is located. |
| twanId | string | 0..1 | Identifies the TWAN Identity of the user where the UE is located. |
| precisionLocation | PrecisionLocation | 0..1 | Identifies the location information of the user where the UE is location if the accuracy of location is higher than cell ID |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Next change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

5.3.2.3.x Type: PrecisionLocation

This data type represents the precise user location information which is sent from the SCEF to the SCS/AS.

**Table 5.3.2.3.x-1: Definition of PrecisionLocation data Type**

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute name** | **Data type** | **Cardinality** | **Description** |
| accuracyFulfilmentIndicator | AccuracyFulfilmentIndicator | 0..1 | The indication whether the obtained location estimate satisfies the requested accuracy or not. |
| ueVelocity | VelocityEstimate | 0..1 | Responsed UE velocity, if requested and available |
| geographicArea | GeographicArea | 0..1 | a geographic area of the user where the UE is located. |
| civicAddress | CivicAddress | 0..1 | civic address of the target UE |
| ldrReference | LdrRefence | 0..1 | LDR reference number |
| eventNotifyDataType | EventNotifyDataType | 1 | the type of event that triggers event notification. |
| terminationCause | TerminationCause | 0..1 | the IE shall be included if event reporting has been terminated. |
| positioningDataList | array(PositioningMethodAndUsage) | 0..N | If present, this IE shall indicate the usage of each non-GANSS positioning method that was attempted to determine the location estimate, either successfully or unsuccessfully. |
| gnssPositioningDataList | array(GnssPositioningMethodAndUsage) | 0..N | If present, this IE shall indicate the usage of each GANSS positioning method that was attempted to determine the location estimate, either successfully or unsuccessfully. |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Next change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

##### 5.3.2.4.3 Enumeration: MonitoringType

The enumeration MonitoringType represents a monitoring event type. It shall comply with the provisions defined in table 5.3.2.4.3-1.

Table 5.3.2.4.3-1: Enumeration MonitoringType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (NOTE 1) |
| LOSS\_OF\_CONNECTIVITY | The SCS/AS requests to be notified when the 3GPP network detects that the UE is no longer reachable for signalling or user plane communication | Loss\_of\_connectivity\_notification |
| UE\_REACHABILITY | The SCS/AS requests to be notified when the UE becomes reachable for sending either SMS or downlink data to the UE | Ue-reachability\_notification |
| LOCATION\_REPORTING | The SCS/AS requests to be notified of the current location or the last known location of the UE | Location\_notification  Location\_notification\_5G |
| CHANGE\_OF\_IMSI\_IMEI\_ASSOCIATION | The SCS/AS requests to be notified when the association of an ME (IMEI(SV)) that uses a specific subscription (IMSI) is changed | Change\_of\_IMSI\_IMEI\_association\_notification |
| ROAMING\_STATUS | The SCS/AS queries the UE's current roaming status and requests to get notified when the status changes | Roaming\_status\_notification |
| COMMUNICATION\_FAILURE | The SCS/AS requests to be notified of communication failure events | Communication\_failure\_notification |
| AVAILABILITY\_AFTER\_DDN\_FAILURE | The SCS/AS requests to be notified when the UE has become available after a DDN failure | Availability\_after\_DDN\_failure\_notification, Availability\_after\_DDN\_failure\_notification\_enhancement |
| NUMBER\_OF\_UES\_IN\_AN\_AREA | The SCS/AS requests to be notified the number of UEs in a given geographic area | Number\_of\_UEs\_in\_an\_area\_notification, Number\_of\_UEs\_in\_an\_area\_notification\_5G |
| PDN\_CONNECTIVITY\_STATUS | The SCS/AS requests to be notified when the 3GPP network detects that the UE’s PDN connection is set up or torn down. | Pdn\_connectivity\_status |
| DOWNLINK\_DATA\_DELIVERY\_STATUS | The AF requests to be notified when the 3GPP network detects that the downlink data delivery status is changed. | Downlink\_data\_delivery\_status\_5G |
| API\_SUPPORT\_CAPABILITY | The SCS/AS requests to be notified of the availability of support of service APIs. | API\_support\_capability\_notification |
| NOTE 1: Properties marked with a feature as defined in subclause 5.3.4 are applicable as described in subclause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 2: More monitoring types can be added in the future based on stage 2. | | |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Next change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 5.3.4 Used Features

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

Table 5.3.4-1: Features used by MonitoringEvent API

|  |  |  |
| --- | --- | --- |
| Feature Number | Feature | Description |
| 1 | Loss\_of\_connectivity\_notification | The SCS/AS is notified when the 3GPP network detects that the UE is no longer reachable for signalling or user plane communication |
| 2 | Ue-reachability\_notification | The SCS/AS is notified when the UE becomes reachable for sending either SMS or downlink data to the UE |
| 3 | Location\_notification | The SCS/AS is notified of the current location or the last known location of the UE |
| 4 | Change\_of\_IMSI\_IMEI\_association\_notification | The SCS/AS is notified when the association of an ME (IMEI(SV)) that uses a specific subscription (IMSI) is changed |
| 5 | Roaming\_status\_notification | The SCS/AS is notified when the UE's roaming status changes |
| 6 | Communication\_failure\_notification | The SCS/AS is notified of communication failure events |
| 7 | Availability\_after\_DDN\_failure\_notification | The SCS/AS is notified when the UE has become available after a DDN failure |
| 8 | Number\_of\_UEs\_in\_an\_area\_notification | The SCS/AS is notified the number of UEs present in a given geographic area  The feature supports the pre-5G (e.g. 4G) requirement. |
| 9 | 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. |
| 10 | Notification\_test\_event | The testing of notification connection is supported according to subclause 5.2.5.3. |
| 11 | Subscription\_modification | Modifications of an individual subscription resource. |
| 12 | Number\_of\_UEs\_in\_an\_area\_notification\_5G | The AF is notified the number of UEs present in a given geographic area.  The feature supports the 5G requirement. This feature may only be supported in 5G. |
| 13 | Pdn\_connectivity\_status | The SCS/AS requests to be notified when the 3GPP network detects that the UE’s PDN connection is set up or torn down. |
| 14 | Downlink\_data\_delivery\_status\_5G | The AF requests to be notified when the 3GPP network detects that the downlink data delivery status is changed. The feature is not applicable to the pre-5G. |
| 15 | Availability\_after\_DDN\_failure\_notification\_enhancement | The AF is notified when the UE has become available after a DDN failure and the traffic matches the packet filter provided by the AF. The feature is not applicable to the pre-5G. |
| 16 | Enhanced\_param\_config | This feature supports the co-existence of multiple event configurations for target UE(s) if there are parameters affecting periodic RAU/TAU timer and/or Active Time. Supporting this feature also requires the support of feature number 1 or 2. |
| 17 | API\_support\_capability\_notification | The SCS/AS is notified of the availability of support of service APIs. This feature is only applicable in interworking SCEF+NEF scenario. |
| 18 | Location\_notification\_5G | The current location or the last known location of the UE is exposed to the SCS/AS. |
| 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.3 MonitoringEvent API

openapi: 3.0.0

info:

title: 3gpp-monitoring-event

version: 1.1.0.alpha-4

description: |

API for Monitoring Event.

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externalDocs:

description: 3GPP TS 29.122 V16.4.0 T8 reference point for Northbound APIs

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

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-monitoring-event/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:

- MonitoringEvent 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 (Successful get all of the active subscriptions for the SCS/AS)

content:

application/json:

schema:

type: array

items:

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

minItems: 0

description: Monitoring event subscriptions

'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 for monitoring event notification

tags:

- MonitoringEvent API Subscription level POST Operation

parameters:

- name: scsAsId

in: path

description: Identifier of the SCS/AS

required: true

schema:

type: string

requestBody:

description: Subscription for notification about monitoring event

required: true

content:

application/json:

schema:

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

callbacks:

notificationDestination:

'{request.body#/notificationDestination}':

post:

requestBody: # contents of the callback message

required: true

content:

application/json:

schema:

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

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/MonitoringEventSubscription'

headers:

Location:

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

required: true

schema:

type: string

'200':

description: The operation is successful and immediate report is included.

content:

application/json:

schema:

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

'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:

- MonitoringEvent 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/MonitoringEventSubscription'

'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:

- MonitoringEvent 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/MonitoringEventSubscription'

responses:

'200':

description: OK (Successful update of the subscription)

content:

application/json:

schema:

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

'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 monitoring event subscription

tags:

- MonitoringEvent 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)

'200':

description: OK (Successful deletion of the existing subscription)

content:

application/json:

schema:

type: array

items:

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

minItems: 1

description: The subscription was terminated successfully, the monitoring event report(s) shall be included if received.

'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:

MonitoringEventSubscription:

type: object

properties:

self:

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

supportedFeatures:

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

mtcProviderId:

type: string

description: Identifies the MTC Service Provider and/or MTC Application.

externalId:

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

msisdn:

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

externalGroupId:

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

addExtGroupId:

type: array

items:

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

minItems: 2

ipv4Addr:

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

ipv6Addr :

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

notificationDestination:

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

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'

monitoringType:

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

maximumNumberOfReports:

type: integer

minimum: 1

description: Identifies the maximum number of event reports to be generated by the HSS, MME/SGSN as specified in subclause 5.6.0 of 3GPP TS 23.682 [2].

monitorExpireTime:

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

groupReportGuardTime:

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

maximumDetectionTime:

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

reachabilityType:

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

maximumLatency:

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

maximumResponseTime:

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

suggestedNumberOfDlPackets:

type: integer

minimum: 0

description: If "monitoringType" is "UE\_REACHABILITY", this parameter may be included to identify the number of packets that the serving gateway shall buffer in case that the UE is not reachable.

idleStatusIndication:

type: boolean

description: If "monitoringType" is set to "UE\_REACHABILITY" or "AVAILABILITY\_AFTER\_DDN\_FAILURE", this parameter may be included to indicate the notification of when a UE, for which PSM is enabled, transitions into idle mode. - "true" indicate enabling of notification - "false" indicate no need to notify Default "false".

locationType:

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

accuracy:

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

minimumReportInterval:

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

maxmumReportInterval:

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

samplingInterval:

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

occurrenceInfo:

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

reportingLocationReg:

type: boolean

description: Indicates whether to request the location estimate for event reporting.

linearDistance:

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

associationType:

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

plmnIndication:

type: boolean

description: If "monitoringType" is "ROAMING\_STATUS", this parameter may be included to indicate the notification of UE's Serving PLMN ID. - "true" The value shall be used to indicate enabling of notification; - "false" The value shall be used to indicate disabling of notification. Default "false".

locationArea:

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

locationArea5G:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

dddTraDes:

$ref: 'TS29508\_Nsmf\_EventExposure.yaml#/components/schemas/DddTrafficDescriptor'

dddStati:

type: array

items:

$ref: 'TS29508\_Nsmf\_EventExposure.yaml#/components/schemas/DddStatus'

apiNames:

type: array

items:

type: string

minItems: 1

supi:

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

gpsi:

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

externalGroupId:

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

pseudonymOfUe:

$ref: '# TS29515\_Ngmlc\_Location.yaml#/components/schemas/PseudonymOfUe'

externalClientType:

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

locationQoS:

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

supportedGADShapes:

type: array

items:

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

minItems: 1

serviceIdentity:

$ref: 'TS29515\_Ngmlc.yaml#/components/schemas/ServiceIdentity'

codeWord:

$ref: 'TS29515\_Ngmlc.yaml#/components/schemas/CodeWord'

serviceCoverage:

type: array

items:

$ref: 'TS29515\_Ngmlc.yaml#/components/schemas/E164CountryCodeOfGeographicArea'

minItems: 1

ldrType:

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

lcsServiceType:

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

velocityRequested:

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

priority:

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

locationTypeRequested:

$ref: 'TS29515\_Ngmlc\_Location.yaml#/components/schemas/LocationTypeRequested'

maximumAgeOfLocationEstimate:

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

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

required:

- notificationDestination

- monitoringType

anyOf:

- required: [maximumNumberOfReports]

- required: [monitorExpireTime]

MonitoringNotification:

type: object

properties:

subscription:

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

configResults:

type: array

items:

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

minItems: 1

description: Each element identifies a notification of grouping configuration result.

monitoringEventReports:

type: array

items:

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

minItems: 1

description: Monitoring event reports.

cancelInd:

type: boolean

description: Indicates whether to request to cancel the corresponding monitoring subscription. Set to false or omitted otherwise.

appliedParam:

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

required:

- subscription

MonitoringEventReport:

type: object

properties:

imeiChange:

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

externalId:

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

idleStatusInfo:

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

locationInfo:

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

lossOfConnectReason:

type: integer

description: If "monitoringType" is "LOSS\_OF\_CONNECTIVITY", this parameter shall be included if available to identify the reason why loss of connectivity is reported. Refer to 3GPP TS 29.336 [11] Subclause 8.4.58.

maxUEAvailabilityTime:

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

msisdn:

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

monitoringType:

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

uePerLocationReport:

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

plmnId:

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

reachabilityType:

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

roamingStatus:

type: boolean

description: If "monitoringType" is "ROAMING\_STATUS", this parameter shall be set to "true" if the UE is on roaming status. Set to false or omitted otherwise.

failureCause:

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

eventTime:

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

pdnConnInfo:

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

dddStatus:

$ref: 'TS29508\_Nsmf\_EventExposure.yaml#/components/schemas/DddStatus'

maxWaitTime:

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

apiCaps:

type: array

items:

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

required:

- monitoringType

IdleStatusInfo:

type: object

properties:

activeTime:

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

edrxCycleLength:

format: float

type: number

minimum: 0

suggestedNumberOfDlPackets:

type: integer

minimum: 0

description: Identifies the number of packets shall be buffered in the serving gateway. It shall be present if the idle status indication is requested by the SCS/AS with "idleStatusIndication" in the "monitoringEventSubscription" sets to "true".

idleStatusTimestamp:

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

periodicAUTimer:

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

UePerLocationReport:

type: object

properties:

ueCount:

type: integer

minimum: 0

description: Identifies the number of UEs.

externalIds:

type: array

items:

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

minItems: 1

description: Each element uniquely identifies a user.

msisdns:

type: array

items:

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

minItems: 1

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

required:

- ueCount

LocationInfo:

type: object

properties:

ageOfLocationInfo:

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

cellId:

type: string

description: Indicates the Cell Global Identification of the user which identifies the cell the UE is registered.

enodeBId:

type: string

description: Indicates the eNodeB in which the UE is currently located.

routingAreaId:

type: string

description: Identifies the Routing Area Identity of the user where the UE is located.

trackingAreaId:

type: string

description: Identifies the Tracking Area Identity of the user where the UE is located.

plmnId:

type: string

description: Identifies the PLMN Identity of the user where the UE is located.

twanId:

type: string

description: Identifies the TWAN Identity of the user where the UE is located.

precisionLocation:

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

FailureCause:

type: object

properties:

bssgpCause:

type: integer

description: Identifies a non-transparent copy of the BSSGP cause code. Refer to 3GPP TS 29.128 [12].

causeType:

type: integer

description: Identify the type of the S1AP-Cause. Refer to 3GPP TS 29.128 [12].

gmmCause:

type: integer

description: Identifies a non-transparent copy of the GMM cause code. Refer to 3GPP TS 29.128 [12].

ranapCause:

type: integer

description: Identifies a non-transparent copy of the RANAP cause code. Refer to 3GPP TS 29.128 [12].

ranNasCause:

type: string

description: Indicates RAN and/or NAS release cause code information, TWAN release cause code information or untrusted WLAN release cause code information. Refer to 3GPP TS 29.214 [10].

s1ApCause:

type: integer

description: Identifies a non-transparent copy of the S1AP cause code. Refer to 3GPP TS 29.128 [12].

smCause:

type: integer

description: Identifies a non-transparent copy of the SM cause code. Refer to 3GPP TS 29.128 [12].

PdnConnectionInformation:

type: object

properties:

status:

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

apn:

type: string

description: Identify the APN, it is depending on the SCEF local configuration whether or not this attribute is sent to the SCS/AS.

pdnType:

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

interfaceInd:

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

ipv4Addr:

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

ipv6Addr:

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

required:

- status

- pdnType

anyOf:

- required: [ipv4Addr]

- required: [ipv6Addr]

AppliedParameterConfiguration:

type: object

properties:

externalIds:

type: array

items:

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

minItems: 1

description: Each element uniquely identifies a user.

msisdns:

type: array

items:

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

minItems: 1

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

maximumLatency:

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

maximumResponseTime:

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

maximumDetectionTime:

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

ApiCapabilityInfo:

type: object

properties:

apiName:

type: string

suppFeat:

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

required:

- apiName

- suppFeat

PrecisionLocation:

type: object

properties:

accuracyFulfilmentIndicator:

$ref: 'TS29572\_Nlmf\_location.yaml#/components/schemas/SupportedFeatures'

ueVelocity:

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

geograhicArea:

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

civicAddress:

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

ldrReference:

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

eventNotifyDataType:

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

terminationCause:

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

positioningDataList:

type: array

items:

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

minItems: 1

gnssPositioningDataList:

type: array

items:

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

minItems: 1

terminationCause:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/TerminationCause' required: - eventNotifyDataType

MonitoringType:

anyOf:

- type: string

enum:

- LOSS\_OF\_CONNECTIVITY

- UE\_REACHABILITY

- LOCATION\_REPORTING

- CHANGE\_OF\_IMSI\_IMEI\_ASSOCIATION

- ROAMING\_STATUS

- COMMUNICATION\_FAILURE

- AVAILABILITY\_AFTER\_DDN\_FAILURE

- NUMBER\_OF\_UES\_IN\_AN\_AREA

- PDN\_CONNECTIVITY\_STATUS

- DOWNLINK\_DATA\_DELIVERY\_STATUS

- API\_SUPPORT\_CAPABILITY

- 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

- LOSS\_OF\_CONNECTIVITY: The SCS/AS requests to be notified when the 3GPP network detects that the UE is no longer reachable for signalling or user plane communication

- UE\_REACHABILITY: The SCS/AS requests to be notified when the UE becomes reachable for sending either SMS or downlink data to the UE

- LOCATION\_REPORTING: The SCS/AS requests to be notified of the current location or the last known location of the UE

- CHANGE\_OF\_IMSI\_IMEI\_ASSOCIATION: The SCS/AS requests to be notified when the association of an ME (IMEI(SV)) that uses a specific subscription (IMSI) is changed

- ROAMING\_STATUS: The SCS/AS queries the UE's current roaming status and requests to get notified when the status changes

- COMMUNICATION\_FAILURE: The SCS/AS requests to be notified of communication failure events

- AVAILABILITY\_AFTER\_DDN\_FAILURE: The SCS/AS requests to be notified when the UE has become available after a DDN failure

- NUMBER\_OF\_UES\_IN\_AN\_AREA: The SCS/AS requests to be notified the number of UEs in a given geographic area

- PDN\_CONNECTIVITY\_STATUS: The SCS/AS requests to be notified when the 3GPP network detects that the UE’s PDN connection is set up or torn down

- DOWNLINK\_DATA\_DELIVERY\_STATUS: The AF requests to be notified when the 3GPP network detects that the downlink data delivery status is changed.

- API\_SUPPORT\_CAPABILITY: The SCS/AS requests to be notified of the availability of support of service APIs.

ReachabilityType:

anyOf:

- type: string

enum:

- SMS

- DATA

- 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

- SMS : The SCS/AS requests to be notified when the UE becomes reachable for sending SMS to the UE

- DATA: The SCS/AS requests to be notified when the UE becomes reachable for sending downlink data to the UE

LocationType:

anyOf:

- type: string

enum:

- CURRENT\_LOCATION

- LAST\_KNOWN\_LOCATION

- 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

- CURRENT\_LOCATION: The SCS/AS requests to be notified for current location

- LAST\_KNOWN\_LOCATION: The SCS/AS requests to be notified for last known location

AssociationType:

anyOf:

- type: string

enum:

- IMEI

- IMEISV

- 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

- IMEI: The value shall be used when the change of IMSI-IMEI association shall be detected

- IMEISV: The value shall be used when the change of IMSI-IMEISV association shall be detected

Accuracy:

anyOf:

- type: string

enum:

- CGI\_ECGI

- ENODEB

- TA\_RA

- PLMN

- TWAN\_ID

- GEO\_AREA

- 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

- CGI\_ECGI: The SCS/AS requests to be notified at cell level location accuracy.

- ENODEB: The SCS/AS requests to be notified at eNodeB level location accuracy.

- TA\_RA: The SCS/AS requests to be notified at TA/RA level location accuracy.

- PLMN: The SCS/AS requests to be notified at PLMN level location accuracy.

- TWAN\_ID: The SCS/AS requests to be notified at TWAN identifier level location accuracy.

- GEO\_AREA: The SCS/AS requests to be notified of the geographical area accuracy.

PdnConnectionStatus:

anyOf:

- type: string

enum:

- CREATED

- RELEASED

- 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

- CREATED: The PDN connection is created.

- RELEASED: The PDN connection is released.

PdnType:

anyOf:

- type: string

enum:

- IP

- NON\_IP

- 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

- IP: PDN connection of IP type.

- NON\_IP: PDN connection of non-IP type.

InterfaceIndication:

anyOf:

- type: string

enum:

- EXPOSURE\_FUNCTION

- PDN\_GATEWAY

- 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

- EXPOSURE\_FUNCTION: SCEF is used for the PDN connection towards the SCS/AS.

- PDN\_GATEWAY: PDN gateway is used for the PDN connection towards the SCS/AS.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*End of changes\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*