**3GPP TSG- Meeting #C3-234xxx**

**Xiamen, China, – was C3-234115**

|  |
| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **29.591** | **CR** | **0153** | **rev** | **1** | **Current version:** | **18.3.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
|  |

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

|  |
| --- |
|  |
| ***Title:***  | Complete the definition of the content of the GNSS Assistance Data Collection information |
|  |  |
| ***Source to WG:*** | Huawei, CATT, Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | 5G\_eLCS\_Ph3 |  | ***Date:*** | 2023-09-29 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-18 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | The definition of the GNSS Assistance Data needs to be completed.As per clause 3.1 of TS 23.273, the GNSS Assistance Data should be defined as specified in clause 6.5.2.1 of TS 37.355. In order to keep the same encoding, avoid misalignments and enable easy future evolutivity, it is proposed to defined the corresponding GNSSAssistData data type a simple Bytes-encoded data type based on clause 6.5.2.1 of TS 37.355. |
|  |  |
| ***Summary of change:*** | This CR proposes to:* Define GNSS Assistance Data as proposed above.
* Update the corresponding feature description.
* Additional corrections and editorial changes.
 |
|  |  |
| ***Consequences if not approved:*** | * The definition of the "GNSS Assistance Data Collection" functionality is not completed in stage 3.
 |
|  |  |
| ***Clauses affected:*** | 2, 5.1.6.2.4, 5.1.6.2.13, 5.1.6.2.14, 5.1.6.2.15, 5.1.6.3.2, 5.1.8, A.2 |
|  |  |
|  | **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 backwards compatible new feature to the OpenAPI description of the Nnef\_EventExposure API (southbound leg) defined in this specification and the Naf\_EventExposure API defined in TS 29.517. |
|  |  |
| ***This CR's revision history:*** |  |

\* \* \* \* 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 23.501: "System Architecture for the 5G System; Stage 2".

[3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[4] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

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

[6] OpenAPI: "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.

[7] 3GPP TR 21.900: "Technical Specification Group working methods".

[8] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

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

[10] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".

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

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

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

[14] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".

[15] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".

[16] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

[17] 3GPP TS 29.520: "5G System; Network Data Analytics Services; Stage 3".

[18] 3GPP TS 29.517: "5G System; Application Function Event Exposure Service; Stage 3".

[19] 3GPP TS 29.551: "5G System; Packet Flow Description Management Service; Stage 3".

[20] 3GPP TS 29.541: "5G System; Network Exposure (NE) function services for Non-IP Data Delivery (NIDD) and Short Message Services (SMS); Stage 3".

[21] 3GPP TS 29.554: "5G System; Background Data Transfer Policy Control Service; Stage 3".

[22] 3GPP TS 29.523: "5G System; Policy Control Event Exposure Service; Stage 3".

[23] 3GPP TS 29.256: "Uncrewed Aerial Systems Network Function (UAS-NF); Aerial Management Services; Stage 3".

[24] 3GPP TS 26.531: "Data Collection and Reporting; General Description and Architecture".

[25] 3GPP TS 26.501: "5G Media Streaming (5GMS); General description and architecture".

[26] 3GPP TS 26.512: "5G Media Streaming (5GMS); Protocols".

[27] 3GPP TS 23.273: "5G System (5GS) Location Services (LCS); Stage 2".

[28] 3GPP TS 29.572: "5G System; Location Management Services; Stage 3".

[29] 3GPP TS 29.122: "T8 reference point for northbound Application Programming Interfaces (APIs)".

[30] 3GPP TS 29.519: "5G System; Usage of the Unified Data Repository service for Policy Control Data, Application Data and Structured Data for Exposure; Stage 3".

[31] 3GPP TS 37.355: "LTE Positioning Protocol (LPP)".

\* \* \* \* Next changes \* \* \* \*

#### 5.1.6.1 General

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

Table 5.1.6.1-1 specifies the data types defined for the Nnef\_EventExposure service based interface protocol.

Table 5.1.6.1-1: Nnef\_EventExposure specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| GNSSAssistData | 5.1.6.3.2 | Represents GNSS Assistance Data. | GNSSAssistData |
| GNSSAssistDataInfo | 5.1.6.2.13 | Represents GNSS Assistance Data related information. | GNSSAssistData |
| GNSSServArea | 5.1.6.2.14 | Represents the serving area of the GNSS Assistance Data. | GNSSAssistData |
| NefEvent | 5.1.6.3.3 | Represents Network Exposure Events. |  |
| NefEventExposureNotif | 5.1.6.2.3 | Represents notifications on network exposure event(s) that occurred for an Individual Network Exposure Event Subscription resource. |  |
| NefEventExposureSubsc | 5.1.6.2.2 | Represents an Individual Network Exposure Event Subscription resource. |  |
| NefEventFilter | 5.1.6.2.7 | Represents event filter information for an event. |  |
| NefEventNotification | 5.1.6.2.4 | Represents information related to an event to be reported. |  |
| NefEventSubs | 5.1.6.2.5 | Represents an event to be subscribed and the related event filter information |  |
| PerformanceDataInfo | 5.1.6.2.12 | Contains Performance Data Analytics related information collection | PerformanceData |
| ServiceExperienceInfo | 5.1.6.2.9 | Contains service experience information associated with an application. | ServiceExperience |
| TargetUeIdentification | 5.1.6.2.8 | Identifies the UE to which the request applies. |  |
| UeCommunicationInfo | 5.1.6.2.6 | Contains UE communication information associated with an application. | UeCommunication |
| UeMobilityInfo | 5.1.6.2.10 | Contains UE mobility information associated with an application. | UeMobility |
| UeTrajectoryInfo | 5.1.6.2.11 | Contains UE trajectory information. | UeMobility |

Table 5.1.6.1-2 specifies data types re-used by the Nnef\_EventExposure service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nnef\_EventExposure service based interface.

Table 5.1.6.1-2: Nnef\_EventExposure re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| AddrFqdn | 3GPP TS 29.517 [18] | IP address and/or FQDN. |  |
| ApplicationId | 3GPP TS 29.571 [16] | Application identifier |  |
| CollectiveBehaviourFilter | 3GPP TS 29.517 [18] | Contains the parameter type and value pair to express the collective behaviour event filters. | CollectiveBehaviour |
| CollectiveBehaviourInfo | 3GPP TS 29.517 [18] | Contains the collective behaviour analytics information. | CollectiveBehaviour |
| CommunicationCollection | 3GPP TS 29.517 [18] | Contains communication information. | UeCommunication |
| DateTime | 3GPP TS 29.571 [16] | Contains a date and a time. |  |
| DatVolTransTimeCollection | 3GPP TS 29.517 [18] | Contains data volume transfer time information. | DataVolTransferTime |
| Dnai | 3GPP TS 29.571 [16] |  |  |
| DispersionCollection | 3GPP TS 29.517 [18] | Contains dispersion collection information. | Dispersion |
| DurationSec | 3GPP TS 29.571 [16] | Indicates a period of time in units of seconds. | DataVolTransferTime |
| ExceptionInfo | 3GPP TS 29.517 [18] | Represents exception information for a service flow. | Exceptions |
| GeographicArea | 3GPP TS 29.572 [28] | Represents a geographic area. |  |
| GeographicalCoordinates | 3GPP TS 29.572 [28] | Represents geographical coordinates. |  |
| GroupId | 3GPP TS 29.571 [16] | Contains a Group identifier. |  |
| IpAddr | 3GPP TS 29.571 [16] | Identifies the IP address of a UE. | PerformanceData |
| MSAccessActivityCollection | 3GPP TS 29.517 [18] | Represents the Media Streaming access activity of UE Application collected via Data Collection AF. | MSAccessActivity |
| MsConsumptionCollection | 3GPP TS 29.517 [18] | Represents the Media Streaming Consumption reports of UE Application collected via Data Collection AF. | MSConsumption |
| MsDynPolicyInvocationCollection | 3GPP TS 29.517 [18] | Represents the Media Streaming Dynamic Policy Invocation of UE Application collected via Data Collection AF. | MSDynPolicyInvocation |
| MsQoeMetricsCollection | 3GPP TS 29.517 [18] | Represents the Media Streaming QoE Metrics of UE Application collected via Data Collection AF. | MSQoeMetrics |
| MsNetAssInvocationCollection | 3GPP TS 29.517 [18] | Represents the Media Streaming Network Assistance invocation of UE Application collected via Data Collection AF. | MSNetAssInvocation |
| NetworkAreaInfo | 3GPP TS 29.554 [21] | Represents a network area information. |  |
| PacketDelBudget | 3GPP TS 29.571 [16] | Indicates average Packet Delay. | PerformanceData |
| PacketLossRate | 3GPP TS 29.571 [16] | Indicates average Loss Rate. | PerformanceData |
| PerformanceData | 3GPP TS 29.517 [18] | Contains Performance Data | PerformanceData |
| RedirectResponse | 3GPP TS 29.571 [16] | Contains redirection related information. | ES3XX |
| ReportingInformation | 3GPP TS 29.523 [22] | Represents the type of reporting the subscription requires. |  |
| Supi | 3GPP TS 29.571 [16] | Contains a SUPI. |  |
| SupportedFeatures | 3GPP TS 29.571 [16] | Indicates the features supported. |  |
| ServiceExperienceInfoPerFlow | 3GPP TS 29.517 [18] | Contains service experience information associated with a service flow. | ServiceExperience |
| Tai | 3GPP TS 29.571 [16] | Represents the identifier of a tracking area. |  |
| Uinteger | 3GPP TS 29.571 [16] | Unsigned integer. | ServiceExperienceExt\_eNA |
| UserDataCongestionCollection | 3GPP TS 29.517 [18] | Contains User Data Congestion Analytics related information collection. | UserDataCongestion |
| UserLocation | 3GPP TS 29.571 [16] | Contains user location information. | UeMobility |
| Uri | 3GPP TS 29.571 [16] | Contains a URI. |  |
| Volume | 3GPP TS 29.122 [29] | Unsigned integer identifying a volume in units of bytes. | DataVolTransferTime |

\* \* \* \* Next changes \* \* \* \*

##### 5.1.6.2.4 Type: NefEventNotification

Table 5.1.6.2.4-1: Definition of type NefEventNotification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| event | NefEvent | M | 1 | Represents the reported application related event. |  |
| timeStamp | DateTime | M | 1 | Time at which the event is observed. |  |
| svcExprcInfos | array(ServiceExperienceInfo) | C | 1..N | Contains the service experience information.Shall be present if the "event" attribute sets to "SVC\_EXPERIENCE" | ServiceExperience |
| ueMobilityInfos | array(UeMobilityInfo) | C | 1..N | Contains the UE mobility information.Shall be present if the "event" attribute sets to "UE\_MOBILITY" | UeMobility |
| ueCommInfos | array(UeCommunicationInfo) | C | 1..N | Contains the application communication information.Shall be present if the "event" attribute sets to "UE\_COMM" | UeCommunication |
| excepInfos | array(ExceptionInfo) | C | 1..N | Each element represents the exception information for a service flow. Shall be present if the "event" attribute sets to "EXCEPTIONS". | Exceptions |
| congestionInfos | array(UserDataCongestionCollection) | C | 1..N | Each element represents the user data congestion information for an AF application. Shall be present if the "event" attribute sets to "USER\_DATA\_CONGESTION". | UserDataCongestion |
| perfDataInfos | array(PerformanceDataInfo) | C | 1..N | Each element represents the performance data information collected for an AF application.  | PerformanceData |
| dispersionInfos | array(DispersionCollection) | C | 1..N | Each element represents the UE dispersion information collected for an AF. Shall be present if the "event" attribute sets to "DISPERSION". | Dispersion |
| collBhvrInfs | array(CollectiveBehaviourInfo) | C | 1..N | Each element represents the collective behaviour information related to a set of UEs, applications. Shall be present if the "event" attribute sets to "COLLECTIVE\_BEHAVIOUR". | CollectiveBehaviour |
| msQoeMetrInfos | array(MsQoeMetricsCollection) | C | 1..N | Each element represents the Media Streaming QoE metrics information collected for an UE application via the Data Collection AF. Shall be present if the "event" attribute sets to "MS\_QOE\_METRICS". | MSQoeMetrics |
| msConsumpInfos | array(MsConsumptionCollection) | C | 1..N | Each element represents the Media Streaming Consumption reports information collected for an UE application via the Data Collection AF. Shall be present if the "event" attribute sets to "MS\_CONSUMPTION". | MSConsumption |
| msNetAssInvInfos | array(MsNetAssInvocationCollection) | C | 1..N | Each element represents the Media Streaming Network Assistance invocation information collected for an UE application via the Data Collection AF. Shall be present if the "event" attribute sets to "MS\_NET\_ASSIST\_INVOCATION". | MSNetAssInvocation |
| msDynPlyInvInfos | array(MsDynPolicyInvocationCollection) | C | 1..N | Each element represents the Media Streaming Dynamic Policy Invocation information collected for an UE application via the Data Collection AF. Shall be present if the "event" attribute sets to "MS\_DYN\_POLICY\_INVOCATION". | MSDynPolicyInvocation |
| msAccActInfos | array(MSAccessActivityCollection) | C | 1..N | Each element represents the Media Streaming access activity collected for an UE application via the Data Collection AF. Shall be present if the "event" attribute sets to "MS\_ACCESS\_ACTIVITY". | MSAccessActivity |
| gnssAssistDataInfo | GNSSAssistDataInfo | C | 0..1 | Represents the GNSS Assistance data information.This attribute shall be present only if the "event" attribute is set to "GNSS\_ASSISTANCE\_DATA". | GNSSAssistData |
| datVolTransTimeInfos | array(DatVolTransTimeCollection) | C | 1..N | Each element represents the data volume transfer time information related to an UE. The "gpsi" attribute within the DatVolTransTimeCollection data type is not applicable.This attribute shall be present if the "event" attribute sets to "DATA\_VOLUME\_TRANSFER\_TIME". | DataVolTransferTime |

\* \* \* \* Next changes \* \* \* \*

##### 5.1.6.2.13 Type GNSSAssistDataInfo

**Table 5.1.6.2.13-1: Definition of type GNSSAssistDataInfo**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute name** | **Data type** | **P** | **Cardinality** | **Description** | **Applicability** |
| gnssAssistData | GNSSAssistData | M | 1 | Contains the GNSS Assistance Data. |  |
| servArea | GNSSServArea | M | 1 | Contains the serving area of the provided GNSS Assistance Data. |  |
| sourceInfo | GeographicalCoordinates | O | 0..1 | Contains the global geographical coordinates of the source of the GNSS assistance data provided within the "gnssAssistData" attribute. |  |

\* \* \* \* Next changes \* \* \* \*

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| --- | --- | --- | --- | --- | --- |
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|  |  |  |  |  |  |

\* \* \* \* Next changes \* \* \* \*

##### 5.1.6.2.14 Type GNSSServArea

**Table 5.1.6.2.14-1: Definition of type GNSSServArea**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute name** | **Data type** | **P** | **Cardinality** | **Description** | **Applicability** |
| geographicalArea | GeographicArea | C | 0..1 | Contains the GNSS Service Area in the form of a geographical area.(NOTE) |  |
| taiList | array(Tai) | C | 1..N | Contains the GNSS Service Area in the form of a list of tracking area(s).(NOTE) |  |
| NOTE: These attributes are mutually exclusive. Either one of them shall be provided. |

\* \* \* \* Next changes \* \* \* \*

##### 5.1.6.3.2 Simple data types

The simple data types defined in table 5.1.6.3.2-1 shall be supported.

Table 5.1.6.3.2-1: Simple data types

|  |  |  |  |
| --- | --- | --- | --- |
| Type Name | Type Definition | Description | Applicability |
| GNSSAssistData | Bytes | Represents GNSS Assistance Data encoded as specified in clause 6.5.2.1 of 3GPP TS 37.355 [31]. | GNSSAssistData |

\* \* \* \* Next changes \* \* \* \*

### 5.1.8 Feature negotiation

The optional features in table 5.1.8-1 are defined for the Nnef\_EventExposure API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 5.1.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| 1 | ServiceExperience | This feature indicates support for the "SVC\_EXPERIENCE" event. |
| 2 | UeMobility | This feature indicates support for the "UE\_MOBILITY" event. |
| 3 | UeCommunication | This feature indicates support for the "UE\_COMM" event. |
| 4 | Exceptions | This feature indicates support for the "EXCEPTIONS" event. |
| 5 | ES3XX | Extended Support for 3xx redirections. This feature indicates the support of redirection for any service operation, according to Stateless NF procedures as specified in clauses 6.5.3.2 and 6.5.3.3 of 3GPP TS 29.500 [4] and according to HTTP redirection principles for indirect communication, as specified in clause 6.10.9 of 3GPP TS 29.500 [4].  |
| 6 | EneNA | This feature indicates support for the enhancements of network data analytics requirements. |
| 7 | UserDataCongestion | This feature indicates support for the event related to User Data Congestion Analytics related information. |
| 8 | PerformanceData | This feature indicates support for the event related to performance data information. |
| 9 | Dispersion | This feature indicates support for the event related to Dispersion Analytics related information. |
| 10 | CollectiveBehaviour | This feature indicates support of collective behaviour information associated with the UEs and its applications. |
| 11 | MSQoeMetrics | This feature indicates support for the event related to Media Streaming QoE metrics for UE Application collected via the Data Collection AF. |
| 12 | MSConsumption | This feature indicates support for the event related to Media Streaming Consumption reports for UE Application collected via the Data Collection AF. |
| 13 | MSNetAssInvocation | This feature indicates support for the event related to Media Streaming Network Assistance invocation for UE Application collected via the Data Collection AF. |
| 14 | MSDynPolicyInvocation | This feature indicates support for the event related to Media Streaming Dynamic Policy invocation for UE Application collected via the Data Collection AF. |
| 15 | MSAccessActivity | This feature indicates support for the event related to Media Streaming access activity for UE Application collected via the Data Collection AF. |
| 16 | DataAccProfileId | This feature indicates support for Data Access Profile Identifier. |
| 17 | GNSSAssistData | This feature indicates the support of the phase 3 of the enhancements to the 5G LCS functionality.The following functionalities are supported:- GNSS Assistance Data Collection. |
| 18 | UeMobility\_Ext | This feature indicates support for further extensions to the event related to UE mobility supporting AIML including support of list of application service area collection. Supporting this feature also requires the support of feature UeMobility. |
| 19 | PerformanceDataExt\_AIML | This feature indicates the support for the extensions of the analytics related to DN performance supporting AIML, including support of Max/Min UL/DL data collection on packet delay, pack loss and throughput. Supporting this feature also requires the support of feature PerformanceData. |
| 20 | ServiceExperienceExt\_eNA | This feature indicates support for the extensions to service experience supporting eNA, including Service Experience Contribution Weights. Supporting this feature also requires the support of feature ServiceExperience. |
| 21 | EnPerformanceData | This feature indicates support for the enhancements of performance data. It requires the support of the PerformanceData feature. |
| 22 | EnhDataMgmt | Indicates the support of enhanced data management mechanisms. Supporting this feature also requires the support of feature EneNA. |
| 23 | ExtEventFilters | Indicates supported of extended AF event filters. |
| 24 | DataVolTransferTime | This feature indicates support for the event related to data volume transfer time. |

\* \* \* \* Next changes \* \* \* \*

# A.2 Nnef\_EventExposure API

openapi: 3.0.0

info:

 title: Nnef\_EventExposure

 version: 1.3.0-alpha.3

 description: |

 NEF Event Exposure Service.

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 All rights reserved.

externalDocs:

 description: >

 3GPP TS 29.591 V18.2.0; 5G System; Network Exposure Function Southbound Services; Stage 3.

 url: https://www.3gpp.org/ftp/Specs/archive/29\_series/29.591/

servers:

 - url: '{apiRoot}/nnef-eventexposure/v1'

 variables:

 apiRoot:

 default: https://example.com

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

security:

 - {}

 - oAuth2ClientCredentials:

 - nnef-eventexposure

paths:

 /subscriptions:

 post:

 summary: subscribe to notifications

 operationId: CreateIndividualSubcription

 tags:

 - Subscriptions (Collection)

 requestBody:

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '201':

 description: Success

 content:

 application/json:

 schema:

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

 headers:

 Location:

 description: >

 Contains the URI of the newly created resource, according to the structure

 {apiRoot}/nnef-eventexposure/<apiVersion>/subscriptions/{subscriptionId}

 required: true

 schema:

 type: string

 '400':

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

 '401':

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

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '411':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/415'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '502':

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

 '503':

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

 default:

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

 callbacks:

 myNotification:

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

 post:

 requestBody:

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '204':

 description: No Content, Notification was succesfull

 '307':

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

 '308':

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

 '400':

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

 '401':

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

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '411':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/415'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '502':

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

 '503':

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

 default:

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

 /subscriptions/{subscriptionId}:

 get:

 summary: retrieve subscription

 operationId: GetIndividualSubcription

 tags:

 - IndividualSubscription (Document)

 parameters:

 - name: subscriptionId

 in: path

 description: Event Subscription ID

 required: true

 schema:

 type: string

 - name: supp-feat

 in: query

 description: Features supported by the NF service consumer

 required: false

 schema:

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

 responses:

 '200':

 description: OK. Resource representation is returned

 content:

 application/json:

 schema:

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

 '307':

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

 '308':

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

 '400':

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

 '401':

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

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '406':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/406'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '502':

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

 '503':

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

 default:

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

 put:

 summary: update subscription

 operationId: ReplaceIndividualSubcription

 tags:

 - IndividualSubscription (Document)

 requestBody:

 required: true

 content:

 application/json:

 schema:

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

 parameters:

 - name: subscriptionId

 in: path

 description: Event Subscription ID

 required: true

 schema:

 type: string

 responses:

 '200':

 description: OK. Resource was succesfully modified and representation is returned

 content:

 application/json:

 schema:

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

 '204':

 description: No Content. Resource was succesfully modified

 '307':

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

 '308':

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

 '400':

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

 '401':

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

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '411':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/415'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '502':

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

 '503':

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

 default:

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

 delete:

 summary: unsubscribe from notifications

 operationId: DeleteIndividualSubcription

 tags:

 - IndividualSubscription (Document)

 parameters:

 - name: subscriptionId

 in: path

 description: Event Subscription ID

 required: true

 schema:

 type: string

 responses:

 '204':

 description: No Content. Resource was succesfully deleted

 '307':

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

 '308':

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

 '400':

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

 '401':

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

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '502':

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

 '503':

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

 default:

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

components:

 securitySchemes:

 oAuth2ClientCredentials:

 type: oauth2

 flows:

 clientCredentials:

 tokenUrl: '{nrfApiRoot}/oauth2/token'

 scopes:

 nnef-eventexposure: Access to the Nnef\_EventExposure API

 schemas:

 NefEventExposureSubsc:

 description: Represents an Individual Network Exposure Event Subscription resource.

 type: object

 properties:

 dataAccProfId:

 type: string

 eventsSubs:

 type: array

 items:

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

 minItems: 1

 eventsRepInfo:

 $ref: 'TS29523\_Npcf\_EventExposure.yaml#/components/schemas/ReportingInformation'

 notifUri:

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

 notifId:

 type: string

 eventNotifs:

 type: array

 items:

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

 minItems: 1

 suppFeat:

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

 required:

 - eventsSubs

 - notifId

 - notifUri

 NefEventExposureNotif:

 description: >

 Represents notifications on network exposure event(s) that occurred for an Individual Network

 Exposure Event Subscription resource.

 type: object

 properties:

 notifId:

 type: string

 eventNotifs:

 type: array

 items:

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

 minItems: 1

 required:

 - notifId

 - eventNotifs

 NefEventNotification:

 description: Represents information related to an event to be reported.

 type: object

 properties:

 event:

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

 timeStamp:

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

 svcExprcInfos:

 type: array

 items:

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

 minItems: 1

 ueMobilityInfos:

 type: array

 items:

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

 minItems: 1

 ueCommInfos:

 type: array

 items:

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

 minItems: 1

 excepInfos:

 type: array

 items:

 $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/ExceptionInfo'

 minItems: 1

 congestionInfos:

 type: array

 items:

 $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/UserDataCongestionCollection'

 minItems: 1

 perfDataInfos:

 type: array

 items:

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

 minItems: 1

 dispersionInfos:

 type: array

 items:

 $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/DispersionCollection'

 minItems: 1

 collBhvrInfs:

 type: array

 items:

 $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/CollectiveBehaviourInfo'

 minItems: 1

 msQoeMetrInfos:

 type: array

 items:

 $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/MsQoeMetricsCollection'

 minItems: 1

 msConsumpInfos:

 type: array

 items:

 $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/MsConsumptionCollection'

 minItems: 1

 msNetAssInvInfos:

 type: array

 items:

 $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/MsNetAssInvocationCollection'

 minItems: 1

 msDynPlyInvInfos:

 type: array

 items:

 $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/MsDynPolicyInvocationCollection'

 minItems: 1

 msAccActInfos:

 type: array

 items:

 $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/MSAccessActivityCollection'

 minItems: 1

 gnssAssistDataInfo:

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

 datVolTransTimeInfos:

 type: array

 items:

 $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/DatVolTransTimeCollection'

 minItems: 1

 required:

 - event

 - timeStamp

 NefEventSubs:

 description: Represents an event to be subscribed and the related event filter information.

 type: object

 properties:

 event:

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

 eventFilter:

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

 required:

 - event

 NefEventFilter:

 description: Represents event filter information for an event.

 type: object

 properties:

 tgtUe:

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

 appIds:

 type: array

 items:

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

 minItems: 1

 locArea:

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

 collAttrs:

 type: array

 items:

 $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/CollectiveBehaviourFilter'

 minItems: 1

 required:

 - tgtUe

 TargetUeIdentification:

 description: Identifies the UE to which the request applies.

 type: object

 properties:

 supis:

 type: array

 items:

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

 minItems: 1

 interGroupIds:

 type: array

 items:

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

 minItems: 1

 anyUeId:

 type: boolean

 ueIpAddr:

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

 ServiceExperienceInfo:

 description: Contains service experience information associated with an application.

 type: object

 properties:

 appId:

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

 supis:

 type: array

 items:

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

 minItems: 1

 svcExpPerFlows:

 type: array

 items:

 $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/ServiceExperienceInfoPerFlow'

 minItems: 1

 contrWeights:

 type: array

 items:

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

 minItems: 1

 required:

 - svcExpPerFlows

 UeMobilityInfo:

 description: >

 Contains UE mobility information associated with an application. If the "appId" attribute is

 not present, then indicates the collected UE mobility information is applicable to all the

 applications for the UE.

 type: object

 properties:

 supi:

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

 appId:

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

 ueTrajs:

 type: array

 items:

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

 minItems: 1

 areas:

 type: array

 items:

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

 minItems: 1

 required:

 - supi

 - ueTrajs

 UeCommunicationInfo:

 description: Contains UE communication information associated with an application.

 type: object

 properties:

 supi:

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

 interGroupId:

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

 appId:

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

 comms:

 type: array

 items:

 $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/CommunicationCollection'

 minItems: 1

 required:

 - comms

 UeTrajectoryInfo:

 description: Contains UE trajectory information.

 type: object

 properties:

 ts:

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

 location:

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

 required:

 - ts

 - location

 PerformanceDataInfo:

 description: Contains Performance Data Analytics related information collection.

 type: object

 properties:

 appId:

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

 ueIpAddr:

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

 ipTrafficFilter:

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

 userLoc:

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

 appLocs:

 type: array

 items:

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

 minItems: 1

 asAddr:

 $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/AddrFqdn'

 perfData:

 $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/PerformanceData'

 timeStamp:

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

 required:

 - perfData

 - timeStamp

 GNSSAssistDataInfo:

 description: Represents GNSS Assistance Data related information.

 type: object

 properties:

 gnssAssistData:

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

 servArea:

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

 sourceInfo:

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

 required:

 - gnssAssistData

 - servArea

 GNSSServArea:

 description: Represents the serving area of the GNSS Assistance Data.

 type: object

 properties:

 geographicalArea:

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

 taiList:

 type: array

 items:

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

 minItems: 1

 oneOf:

 - required: [geographicalArea]

 - required: [taiList]

# Simple data types and Enumerations

 NefEvent:

 anyOf:

 - type: string

 enum:

 - SVC\_EXPERIENCE

 - UE\_MOBILITY

 - UE\_COMM

 - EXCEPTIONS

 - USER\_DATA\_CONGESTION

 - PERF\_DATA

 - DISPERSION

 - COLLECTIVE\_BEHAVIOUR

 - MS\_QOE\_METRICS

 - MS\_CONSUMPTION

 - MS\_NET\_ASSIST\_INVOCATION

 - MS\_DYN\_POLICY\_INVOCATION

 - MS\_ACCESS\_ACTIVITY

 - GNSS\_ASSISTANCE\_DATA

 - DATA\_VOLUME\_TRANSFER\_TIME

 - 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: |

 Represents a Network Exposure Event.

 Possible values are:

 - SVC\_EXPERIENCE: Indicates that the subscribed/notified event is service experience

 information for an application.

 - UE\_MOBILITY: Indicates that the subscribed/notified event is UE mobility information.

 - UE\_COMM: Indicates that the subscribed/notified event is UE communication information.

 - EXCEPTIONS: Indicates that the subscribed/notified event is exceptions information.

 - USER\_DATA\_CONGESTION: Indicates that the subscribed/notified event is user data congestion

 analytics related information.

 - PERF\_DATA: Indicates that the subscribed/notified event is performance data information.

 - DISPERSION: Indicates that the subscribed/notified event is dispersion information.

 - COLLECTIVE\_BEHAVIOUR: Indicates that the subscribed/notified event is collective behaviour

 information.

 - MS\_QOE\_METRICS: Indicates that the subscribed/notified event is Media Streaming QoE

 metrics.

 - MS\_CONSUMPTION: Indicates that the subscribed/notified event is Media Streaming

 consumption reports.

 - MS\_NET\_ASSIST\_INVOCATION: Indicates that the subscribed/notified event is Media Streaming

 network assistance invocation.

 - MS\_DYN\_POLICY\_INVOCATION: Indicates that the subscribed/notified event is Media Streaming

 dynamic policy invocation.

 - MS\_ACCESS\_ACTIVITY: Indicates that the subscribed/notified event is Media Streaming access

 activity.

 - GNSS\_ASSISTANCE\_DATA: Indicates that the subscribed/notified event is GNSS Assistance Data

 Collection.

 GNSSAssistData:

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

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