**3GPP TSG-CT WG3 Meeting #123e C3-224582**

**E-Meeting, 18th – 26th August 2022 (Revision of C3-224204)**

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| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **29.591** | **CR** | **0089** | **rev** | **1** | **Current version:** | **17.6.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| --- |
|  |
| ***Title:***  | Updates to Media Streaming QoE metrics Event |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | EVEX |  | ***Date:*** | 2022-07-18 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** |  Rel-17 |
|  | *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 Media Streaming QoE metrics related editor’s notes in the procedures and data type need to be resolved to align with stage 2 descriptions.Upon step 2 in clause 5.8 of TS 26.531 describes the subscription indicating the Event ID and may nominate a specific Data Access Profile by citing its unique identifier, and clause 11.4.3 describes the QoE metrics reporting format, these stage 2 normative requirements need to be aligned in this specification. Upon the joint discussion with SA4 that the exisiting EventFilter attributes which including application identifier and location area are also applicable, hence also update in the related procedure description.Since TS 26.512 clause 18 describes the QoE specific as Media Streaming QoE, hence consider to also add Media Streaming to be aligned specific.Upon the SA4 LS reply C3-224526 (S4-221118) and the attached TS 26.501 CR 0040r1 (S4-221108) confirmed that the exisiting commonly applicable UE Ids, the applicaton filter and location filter are applicable as the event filters during the subscription.The OpenAPI file need to be updated to align with above updates. |
|  |  |
| ***Summary of change:*** | Resolve the QoE metrics related editor’s notes in the procedures and update data types on QoE metrics aligned with stage 2 descriptions. Update the OpenAPI accordingn to the updates in the data types. |
|  |  |
| ***Consequences if not approved:*** | Not correct and specific implementation of the Media Streaming QoE metrics event subscription and notification in this specification. |
|  |  |
| ***Clauses affected:*** | 4.2.1.1, 4.2.2.2.1, 4.2.2.2.2, 4.2.2.4.2, 5.1.6.1, 5.1.6.2.2, 5.1.6.2.4, 5.1.6.2.7, 5.1.6.2.8, 5.1.6.3.3, 5.1.8, A.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 26.501 CR 0040  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** | This CR introduces backward compatible feature into the OpenAPI file applicable to Nnef\_EventExposure API. |
|  |  |
| ***This CR's revision history:*** |  |

**Additional discussion(if needed):**

**Proposed changes:**

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

#### 4.2.1.1 Overview

The Nnef\_EventExposure service, as defined in 3GPP TS 23.502 [3], is provided by the Network Exposure Function (NEF). When the UE Application data is collected via the Data Collection AF, the NEF collect the Application Function Exposure Service as defined in 3GPP TS 26.531 [24], 3GPP TS 26.501 [25], and 3GPP TS 26.512 [26], is provided by the Data Collection AF instantiated in 5GMS AF for the Event Consumer AF instantiated in 5GMS ASP.

This service:

- allows NF service consumers to subscribe, modify and unsubscribe for application events; and

- notifies NF service consumers with a corresponding subscription about observed events on the NEF.

The types of observed events applicable for NEF include:

AF application events exposed by AF:

- Service experience;

- UE mobility;

- UE communication;

- Exceptions;

- User Data Congestion;

- Dispersion;

- Performance Data information; and

- Collective Behaviour information

UE application events exposed via Data Collection AF:

- Media Streaming QoE metrics;

- Consumption reports;

- Network Assistance invocations;

- Charging and Policy invocations; and

- Media streaming access activity.

The target of the event reporting may include one or more UE(s), a group of UEs or any UE (i.e. all UEs). When an event to which the NF service consumer has subscribed occurs, the NEF reports the requested information to the NF service consumer based on the event reporting information definition requested by the NF service consumer.

\*\*\* 2nd Change \*\*\*

##### 4.2.2.2.1 General

This service operation is used by an NF service consumer to subscribe to notifications on specified event(s) or modify an existing subscription.

The following are the types of events for which a subscription to notifications can be created by the NWDAF as the NF service consumer:

- Service experience;

- UE mobility;

- UE communication;

- Exceptions;

- User Data Congestion;

- Dispersion;

- Performance Data information; and

- Collective Behaviour information.

The following are the types of events for which a subscription can be made by the NWDAF or Event Consumer AF as the NF service consumer:

- Media Streaming QoE metrics;

The following are the types of events for which a subscription can be made by the Event Consumer AF as the NF service consumer:

- Consumption reports;

- Network Assistance invocations;

- Charging and Policy invocations; and

- Media streaming access activity.

The following procedures using the Nnef\_EventExposure\_Subscribe service operation are supported:

- creating a new subscription;

- modifying an existing subscription.

\*\*\* 3rd Change \*\*\*

##### 4.2.2.2.2 Creating a new subscription

Figure 4.2.2.2.2-1 illustrates the creation of a Network Exposure Event Subscription.



Figure 4.2.2.2.2-1: Creation of a subscription

To subscribe to event notifications, the NF service consumer shall send an HTTP POST request to the NEF with: "{apiRoot}/nnef-eventexposure/<apiVersion>/subscriptions" as request URI as shown in step 1 of figure 4.2.2.2.2-1, and the "NefEventExposureSubsc" data structure as request body.

The "NefEventExposureSubsc" data structure shall include:

- a URI where to receive the requested notifications as "notifUri" attribute;

- a Notification Correlation Identifier assigned by the NF service consumer for the requested notifications as "notifId" attribute; and

- description of subscribed event information as "eventsSubs" attribute by using one or more "NefEventSubs" data.

The "NefEventExposureSubsc" data structure may also include:

- the description of the event reporting information as "eventsRepInfo" attribute.

- a specific Data Access Profile Identifier as "dataAccProfId" attribute, if the feature "DataAccProfileId" is supported and the subscribed events including "MS\_QOE\_METRICS", "MS\_CONSUMPTION", "MS\_NET\_ASSIST\_INVOCATION", "MS\_DYN\_POLICY\_INVOCATION", and/or "MS\_ACCESS\_ACTIVITY".

The "NefEventSubs" data structure shall include:

- an event to subscribe to as a "event" attribute; and

- event filter information as "eventFilter" attribute associated with the event.

The "eventsRepInfo" attribute may include:

- event notification method (periodic, one time, on event detection) as "notifMethod" attribute;

- Maximum Number of Reports as "maxReportNbr" attribute;

- Monitoring Duration as "monDur" attribute;

- repetition period for periodic reporting as "repPeriod" attribute;

- immediate reporting indication as "immRep" attribute;

- sampling ratio as "sampRatio" attribute;

- partitioning criteria for partitioning the UEs before performing sampling as "partitionCriteria" attribute if the EneNA feature is supported;

- group reporting guard time as "grpRepTime" attribute; and/or

- a notification flag as "notifFlag" attribute if the EneNA feature is supported.

If the NEF cannot successfully fulfil the received HTTP POST request due to an internal error or an error in the HTTP POST request, the NEF shall send an HTTP error response as specified in clause 5.1.7.

Upon successful reception of an HTTP POST request with "{apiRoot}/nnef-eventexposure/<apiVersion>/subscriptions" as request URI and "NefEventExposureSubsc" data structure as request body, the NEF shall create a new "Individual Network Exposure Event Subscription" resource, store the subscription and send an HTTP "201 Created" response, as shown in step 2 of figure 4.2.2.2.2-1. The NEF shall include in the "201 Created" response:

- a Location header field; and

- an "NefEventExposureSubsc" data type in the payload body.

The Location header field shall contain the URI of the created individual application session context resource i.e. "{apiRoot}/nnef-eventexposure/<apiVersion>/subscriptions/{subscriptionId}".

The "NefEventExposureSubsc" data type payload body shall contain the representation of the created "Individual Network Exposure Event Subscription".

When the "monDur" attribute is included in the response by the NEF, it represents NEF selected expiry time that is equal or less than the expiry time received in the request.

When the "immRep" attribute is included and set to "true" in the subscription and the subscribed events are available, the NEF shall include the reports of the events subscribed, if available, in the HTTP POST response.

When the sampling ratio attribute, as "sampRatio", is included in the subscription without a "partitionCriteria" attribute, the NEF shall select a random subset of UEs among the target UEs according to the sampling ratio and only report the event(s) related to the selected subset of UEs. If the "partitionCriteria" attribute is additionally included, then the NEF shall first partition the UEs according to the value of the "partitionCriteria" attribute and then select a random subset of UEs from each partition according to the sampling ratio and only report the event(s) related to the selected subsets of UEs.

When the group reporting guard time, as "grpRepTime" attribute, is included in the subscription, the NEF shall accumulate all the event reports for the target UEs until the group reporting guard time expires. Then, the NEF shall notify the NF service consumer using the Nnef\_EventExposure\_Notify service operation, as described in clause 4.2.2.4.

When the "notifFlag" attribute is included and set to "DEACTIVATE" in the request, the NEF shall mute the event notification and store the available events.

\*\*\* 4th Change \*\*\*

##### 4.2.2.4.2 Notification about subscribed events

Figure 4.2.2.4.2-1 illustrates the notification about subscribed events.



Figure 4.2.2.4.2-1: Notification about subscribed events

If the NEF observes application related event(s) for which an NF service consumer has subscribed, the NEF shall send an HTTP POST request as shown in step 1 of figure 4.2.2.4.2-1, with the "{notifUri}" as request URI containing the value previously provided by the NF service consumer within the corresponding subscription, and the "NefEventExposureNotif" data structure.

The "NefEventExposureNotif" data structure shall include:

- notification correlation ID provided by the NF service consumer during the subscription as "notifId" attribute; and

- information about the observed event(s) within the "eventNotifs" attribute that shall contain for each observed event an "NefEventNotification" data structure that shall include:

- the application related event as "event" attribute;

- the time at which the event was observed encoded as "timeStamp" attribute;

- if the "event" attribute is "SVC\_EXPERIENCE", service experience information about the application involved in the reported event in the "svcExprcInfos" attribute;

- if the "event" attribute is "UE\_MOBILITY", UE mobility information assoicated with the application as "ueMobilityInfos" attribute;

- if the "event" attribute is "UE\_COMM", UE communication information assoicated with the application as "ueCommInfos" attribute;

- if the "event" attribute is "EXCEPTIONS", exceptions information associated with a service flow as "excepInfos" attribute;

- if the "event" attribute is "PERF\_DATA", Performance Data Analytics related information as "perfDataInfos" attribute;

- if the "event" attribute is "COLLECTIVE\_BEHAVIOUR", collective behaviour information associated with the UEs and its applications as "collBhvrInfs" attribute;

- if the "event" attribute is "USER\_DATA\_CONGESTION", user data congestion information collected for an AF application as "congestionInfos" attribute; and

- if the "event" attribute is "DISPERSION", UE dispersion information collected for an AF as "dispersionInfos" attribute.

- if the "event" attribute is "MS\_QOE\_METRICS", Media Streaming QoE metrics information collected for an UE application via the Data Collection AF as "msQoeMetrInfos" attribute.

- if the "event" attribute is "CONSUMPTION", Consumption reports information collected for an UE application via the Data Collection AF as "consumpInfos" attribute.

- if the "event" attribute is "NET\_ASSIST\_INVOCATION", Network Assistance invocations information collected for an UE application via the Data Collection AF as "netAssInvInfos" attribute.

- if the "event" attribute is "CHARGING\_POLICY\_INVOCATION", Charging and Policy invocations information collected for an UE application via the Data Collection AF as "chgPlyInvInfos" attribute.

- if the "event" attribute is "MS\_ACCESS\_ACTIVITY", Media Streaming access activity information collected for an UE application via the Data Collection AF as "msAccActInfos" attribute.

If the NF service consumer cannot successfully fulfil the received HTTP POST request due to an internal error or an error in the HTTP POST request, the NF service consumer shall send an HTTP error response as specified in clause 5.1.7.

If the feature "ES3XX" is supported, and the NF service consumer determines the received HTTP POST request needs to be redirected, the NF service consumer shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

Upon successful reception of an HTTP POST request with "{notifUri}" as request URI and "NefEventExposureNotif" data structure as request body, the NF service consumer shall send an HTTP "204 No Content" response, as shown in step 2 of figure 4.2.2.4.2-1, in case of a successful processing.

\*\*\* 5th Change \*\*\*

#### 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 |
| 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 |  |
| ChargPolicyInvocationCollection | 3GPP TS 29.517 [18] | Represents the Charging and Policy nvocations of UE Application collected via Data Collection AF. | ChargingPolicInvocation |
| 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 |
| ConsumptionCollection | 3GPP TS 29.517 [18] | Represents the Consumption reports of UE Application collected via Data Collection AF. | Consumption |
| DateTime | 3GPP TS 29.571 [16] | Contains a date and a time. |  |
| Dnai | 3GPP TS 29.571 [16] |  |  |
| DispersionCollection | 3GPP TS 29.517 [18] | Contains dispersion collection information. | Dispersion |
| ExceptionInfo | 3GPP TS 29.517 [18] | Represents exception information for a service flow. | Exceptions |
| 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 |
| MsQoeMetricsCollection | 3GPP TS 29.517 [18] | Represents the Media Streaming QoE Metrics of UE Application collected via Data Collection AF. | MSQoeMetrics |
| NetAssInvocationCollection | 3GPP TS 29.517 [18] | Represents the Network Assistance invocations of UE Application collected via Data Collection AF. | NetAssInvocation |
| 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 |
| 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. |  |

\*\*\* 6th Change \*\*\*

##### 5.1.6.2.2 Type: NefEventExposureSubsc

Table 5.1.6.2.2-1: Definition of type NefEventExposureSubsc

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| dataAccProfId | string | O | 0..1 | Represents a unique identifier for the Data Access Profile. | DataAccProfileId |
| eventsSubs | array(NefEventSubs) | M | 1..N | Subscribed events and the related event filters.  |  |
| eventsRepInfo | ReportingInformation | O | 0..1 | Represents the reporting requirements of the subscription.If omitted, the default values within the ReportingInformation data type apply. |  |
| notifUri | Uri | M | 1 | Notification URI for event reporting. |  |
| eventNotifs | array(NefEventNotificationData) | C | 1..N | Represents the Events to be reported.Shall only be present if the immediate reporting indication in the "immRep" attribute within the "eventsRepInfo" attribute sets to true in the event subscription, and the reports are available. |  |
| notifId | string | M | 1 | Notification Correlation ID assigned by the NF service consumer. |  |
| suppFeat | SupportedFeatures | C | 0..1 | This IE represents a list of Supported features used as described in clause 5.8. Shall be present in the HTTP POST request/response; or in the HTTP GET response if the "supp-feat" attribute query parameter is included in the HTTP GET request. (NOTE) |  |
| NOTE: In the HTTP POST request it represents the set of NF service consumer supported features. In the HTTP POST and GET responses it represents the set of features supported by both the NF service consumer and the NEF. |

\*\*\* 7th Change \*\*\*

##### 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 |
| consumpInfos | array(ConsumptionCollection) | C | 1..N | Each element represents the Consumption reports information collected for an UE application via the Data Collection AF. Shall be present if the "event" attribute sets to "CONSUMPTION". | Consumption |
| netAssInvInfos | array(NetAssInvocationCollection) | C | 1..N | Each element represents the Network Assistance invocations information collected for an UE application via the Data Collection AF. Shall be present if the "event" attribute sets to "NET\_ASSIST\_INVOCATION". | NetAssInvocation |
| chgPlyInvInfos | array(ChargPolicyInvocationCollection) | C | 1..N | Each element represents the Charging and Policy invocation information collected for an UE application via the Data Collection AF. Shall be present if the "event" attribute sets to "CHARGING\_POLIC\_INVOCATION". | ChargingPolicInvocation |
| 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 |

\*\*\* 8th Change \*\*\*

##### 5.1.6.2.7 Type NefEventFilter

Table 5.1.6.2.7-1: Definition of type NefEventFilter

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| tgtUe | TargetUeIdentification | M | 1 | Represents the UE information to which the request applies. | (NOTE 1) |
| appIds | array(ApplicationId) | C | 1..N | Each element indicates an application identifier.If absent, the NefEventFilter data applies to any application (i.e. all applications). (NOTE 2) | ServiceExperienceExceptionsUeCommunication UeMobilityUserDataCongestionPerformanceDataDispersionMSQoeMetrics |
| locArea | NetworkAreaInfo | O | 0..1 | Represents an area of interest. (NOTE 3) | ServiceExperienceExceptions UeCommunicationUeMobility UserDataCongestionDispersionCollectiveBehaviourMSQoeMetrics |
| collAttrs | array(CollectiveBehaviourFilter) | O | 1..N | Each element indicates a collective attribute parameter type and value. | CollectiveBehaviour |
| NOTE 1: Applicability is further described in the corresponding data type. NOTE 2: For the events "EXCEPTIONS", "UE\_MOBILITY", "UE\_COMM", and "PERF\_DATA", if present, the "appIds" attribute shall include only one element. NOTE 3: For event "SVC\_EXPERIENCE", only the " tais " attribute within the NetworkAreaInfo data is applicable. |

Editor's note: It’s for FFS on the needed attributes for the feature "Consumption".

Editor's note: It’s for FFS on the needed attributes for the feature "NetAssInvocation".

Editor's note: It’s for FFS on the needed attributes for the feature "ChargingPolicyInvocation".

Editor's note: It’s for FFS on the needed attributes for the feature "MSAccessActivity".

\*\*\* 9th Change \*\*\*

##### 5.1.6.2.8 Type TargetUeIdentification

Table 5.1.6.2.8-1: Definition of type TargetUeIdentification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| supis | array(Supi) | O | 1..N | Each element identifies a SUPI for an UE. | ServiceExperienceExceptionsUeMobilityUeCommunication UserDataCongestion DispersionMSQoeMetricsConsumptionNetAssInvocationChargingPolicyInvocationMSAccessActivity |
| interGroupIds | array(GroupId) | O | 1..N | Each element represents an internal group identifier which identifies a group of UEs. | ServiceExperienceExceptionsUeMobilityUeCommunicationMSQoeMetrics |
| anyUeId | boolean | O | 0..1 | Identifies whether the request applies to any UE. This attribute shall set to "true" if applicable for any UE, otherwise, set to "false". | ServiceExperienceExceptionsUserDataCongestion |
| NOTE: For an applicable feature, only one attribute identifying the target UE shall be provided. |

\*\*\* 10th Change \*\*\*

##### 5.1.6.3.3 Enumeration: NefEvent

The enumeration NefEvent represents the observed event requested by the NF service consumer to be monitored. It shall comply with the provisions defined in table 5.1.6.3.3-1.

Table 5.1.6.3.3-1: Enumeration NefEvent

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| SVC\_EXPERIENCE | Indicates that the observed event is service experience information. | ServiceExperience |
| UE\_COMM | Indicates that the observed event is UE communication information. | UeCommunication |
| UE\_MOBILITY | Indicates that the observed event is UE mobility information. | UeMobility |
| EXCEPTIONS | Indicates that the observed event is exceptions information. | Exceptions |
| USER\_DATA\_CONGESTION | Indicates that the event subscribed is user data congestion analytics related information. | UserDataCongestion |
| PERF\_DATA | Indicates that the event subscribed is performance data information. | PerformanceData |
| DISPERSION | Indicates that the event subscribed is dispersion information. | Dispersion |
| COLLECTIVE\_BEHAVIOUR | Indicates that the event subscribed is collective behaviour information. | CollectiveBehaviour |
| MS\_QOE\_METRICS | Indicates that the event subscribed is Media Streaming QoE metrics. | MSQoeMetrics |
| CONSUMPTION | Indicates that the event subscribed is Consumption reports. | Consumption |
| NET\_ASSIST\_INVOCATION | Indicates that the event subscribed is Network Assistance invocations. | NetAssInvocation |
| CHARGING\_POLICY\_INVOCATION | Indicates that the event subscribed is Charging and Policy invocations. | ChargingPolicyInvocation |
| MS\_ACCESS\_ACTIVITY | Indicates that the event subscribed is Media Streaming access activity. | MSAccessActivity |

\*\*\* 11th Change \*\*\*

### 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 | Consumption | This feature indicates support for the event related to Consumption reports for UE Application collected via the Data Collection AF. |
| 13 | NetAssInvocation | This feature indicates support for the event related to Network Assistance invocations for UE Application collected via the Data Collection AF. |
| 14 | ChargingPolicyInvocation | This feature indicates support for the event related to Charging and Policy invocations 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. |
| 17 | DataAccProfileId | This feature indicates support for Data Access Profile Identifier. |

\*\*\* 12th Change \*\*\*

# A.2 Nnef\_EventExposure API

openapi: 3.0.0

info:

 title: Nnef\_EventExposure

 version: 1.1.0

 description: |

 NEF Event Exposure Service.

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externalDocs:

 description: >

 3GPP TS 29.591 V17.6.0; 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'

 '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'

 '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'

 '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'

 '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'

 '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

 consumpInfos:

 type: array

 items:

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

 minItems: 1

 netAssInvInfos:

 type: array

 items:

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

 minItems: 1

 chgPlyInvInfos:

 type: array

 items:

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

 minItems: 1

 msAccActInfos:

 type: array

 items:

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

 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

 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

 required:

 - svcExpPerFlows

 UeMobilityInfo:

 description: Contains UE mobility information associated with an application.

 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

 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

# Simple data types and Enumerations

 NefEvent:

 description: Represents Network Exposure Events.

 anyOf:

 - type: string

 enum:

 - SVC\_EXPERIENCE

 - UE\_MOBILITY

 - UE\_COMM

 - EXCEPTIONS

 - USER\_DATA\_CONGESTION

 - PERF\_DATA

 - DISPERSION

 - COLLECTIVE\_BEHAVIOUR

 - MS\_QOE\_METRICS

 - CONSUMPTION

 - NET\_ASSIST\_INVOCATION

 - CHARGING\_POLICY\_INVOCATION

 - MS\_ACCESS\_ACTIVITY

 - type: string

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