**3GPP TSG-CT WG3 Meeting #108-eC3-201099**

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

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.508** | **CR** | **0066** | **rev** | **-** | **Current version:** | **16.2.0** |  |
|  | | | | | | | | |
| *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:*** | Update of the DDD status event | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, Ericsson | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_CIOT | | | | |  | ***Date:*** | | | 2020-02-28 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 1. Stage 2 agrees that multiple traffic filters can be provided by the AF. 2. Stage 2 agrees that downlink data delivery status event and availability of DDN failure event are independant. 3. Definitions of DddStatus and DddTrafficDescriptor shall be moved to TS 29.571. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. The identifier(s) of the downlink data descriptors impacted by the downlink data delivery status change is included in the notification. Remove the editor’s node. 2. Remove the NOTE to describe that the downlink data delivery status event is also used by the UDM for the purpose of downlink data delivery failure notifications. 3. Remove the definitions of DddStatus and DddTrafficDescriptor. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The downlink data delivery status event is not supported. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.2.2.2, 4.2.3.1, 4.2.3.2, 5.6.1, 5.6.2.4, 5.6.2.5, 5.6.2.6, 5.6.3.5, 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's revision history:*** | | This CR introduces a backwards compatible feature to the OpenAPI file. | | | | | | | | |

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

#### 4.2.2.2 Notification about subscribed events

The present "notification about subscribed events" procedure is performed by the SMF when any of the subscribed events occur.

The following applies with respect to the detection of subscribed events:

- If:

- the SMF supports the "downlink data delivery status" feature,

- the event "downlink data delivery status" with delivery status "DISCARDED" is subscribed,

- the traffic descriptor of the downlink data source has been provided for that subscription,

- the data is buffered at the UPF, and

- the SMF is informed that the UE corresponding to that subscription is unreachable,

then the SMF shall interact with the UPF to remove the buffered packets and shall provide the traffic descriptor in the PDR and request the UPF to report the traffic information (e.g. Source IP address, Source port number) of the discarded packets matching the received traffic descriptor. By comparing the traffic information reported by the UPF with the traffic descriptor received in the corresponding event subscription, the SMF shall determine whether that subscribed event occurred.

Figure 4.2.2.2-1 illustrates the notification about subscribed events.



Figure 4.2.2.2-1: Notification about subscribed events

If the SMF observes PDU Session related event(s) for which an NF service consumer has subscribed to, the SMF shall send an HTTP POST request with "{notifUri}" as previously provided by the NF service consumer within the corresponding subscription as URI and NsmfEventExposureNotification data structure as request body that shall include:

- Notification correlation ID provided by the NF service consumer during the subscription, or as provided by the PCF for implicit subscription of UP path change as defined in subclause 4.2.6.2.6.2 of 3GPP TS 29.512 [14], as "notifId" attribute; and

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

1. the Event Trigger as "event" attribute;

2. for a UP path change notification:

a) type of notification ("EARLY" or "LATE") as "dnaiChgType" attribute;

b) source DNAI and/or target DNAI as "sourceDnai" attribute and "targetDnai" attribute if DNAI is changed, respectively (NOTE 3); and

c) if the PDU Session type is IP, for the source DNAI IP address/prefix of the UE as "sourceUeIpv4Addr" attribute or "sourceUeIpv6Prefix" attribute; and

d) if the PDU Session type is IP, for the target DNAI IP address/prefix of the UE as "targetUeIpv4Addr" attribute or "targetUeIpv6Prefix" attribute;

e) if available (NOTE 3), for the source DNAI, N6 traffic routing information related to the UE as "sourceTraRouting" attribute;

f) if available (NOTE 3), for the target DNAI, N6 traffic routing information related to the UE as "targetTraRouting" attribute; and

g) if the PDU Session type is Ethernet, the MAC address of the UE in the "ueMac" attribute;

NOTE 1: UP path change notification, i.e. DNAI change notification and/or N6 traffic routing information change notification, can be the result of an implicit subscription of the PCF on behalf of the NEF/AF as part of setting PCC rule(s) via the Npcf\_SMPolicyControl service (see subclause 4.2.6.2.6.2 of 3GPP TS 29.512 [14]).

NOTE 2: If the DNAI is not changed while the N6 traffic routing information change, the source DNAI and target DNAI are not provided.

NOTE 3: The change from the UP path status where no DNAI applies to a status where a DNAI applies indicates the activation of the related AF request and therefore only the target DNAI and N6 traffic routing information is provided in the event notification; the change from the UP path status where a DNAI applies to a status where no DNAI applies indicates the de-activation of the related AF request and therefore only the source DNAI and N6 traffic routing information is provided in the event notification.

3. for a UE IP address change:

a) added new UE IP address or prefix as "adIpv4Addr" attribute or "adIpv6Prefix" attribute, respectively; and/or

b) released UE IP address or prefix as "reIpv4Addr" attribute or "reIpv6Prefix" attribute, respectively;

4. for an access type change:

a) new access type as "accType" attribute;

5. for a PLMN Change:

a) new PLMN as "plmnId" attribute;

6. for a PDU Session Release:

a) ID of the released PDU session as "pduSeId" attribute;

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

8. the SUPI as the "supi" attribute if the subscription applies to a group of UE(s) or any UE;

9. if available, the GPSI as the "gpsi" attribute if the subscription applies to a group of UE(s) or any UE;

10. for a Downlink Data Delivery Status:

a) the downlink data delivery status as "dddStatus" attribute;

b) the downlink data descriptors impacted by the downlink data delivery status change within the "dddTraDescriptor" attribute; and

) for downlink data delivery status "BUFFERED". the estimated maximum waiting time as "maxWaitTime" attribute; and.

11. for a Communication Failure:

a) the detailed communication failure information (e.g. 5G SM cause) as "commFailure" attribute.

- an URI for further AF acknowledgement in the "ackUri" attribute if the SMF determines to wait for the AF acknowledgement before activating the new UP path associated with the new DNAI.

NOTE 4: Based on the indication of AF acknowledgment to be expected in the PCC rules received from the PCF and local configuration, the SMF may determine to wait for the AF acknowledgement before activating the new UP path associated with the new DNAI.

Upon the reception of the HTTP POST request with "{notifUri}" as URI and an NsmfEventExposureNotification data structure as request body, the NF shall send an "204 No Content" HTTP response for a succesfull processing.

If the NF service consumer is not able to handle the Notification but knows by implementation specific means that another service consumer is able to handle the notification, it shall reply with an HTTP "307 temporary redirect" error response pointing to the new NF service consumer URI. If the NF service consumer is not able to handle the Notification but another unknown service consumer could possibly handle the notification, it shall reply with an HTTP "404 Not found" error response.

NOTE 5: An AMF as service consumer can change.

If the SMF receives a "307 temporary redirect" response, the SMF shall resend the failed event notification request using the received URI in the Location header field as Notification URI. Subsequent event notifications, triggered after the failed one, shall be sent to the Notification URI provided by the NF service consumer during the corresponding subscription creation/update.

If the SMF becomes aware that a new NF service consumer is requiring notifications (e.g. via the "404 Not found" response, or via Namf\_Communication service AMFStatusChange Notifications, see 3GPP TS 29.518 [13], or via link level failures or via the Nnrf\_NFDiscovery Service (using the service name and GUAMI obtained during the creation of the subscription) to query the other AMFs within the AMF set) specified in 3GPP TS 29.510 [12]), and the SMF knows alternate or backup IPv4 or IPv6 Addess(es) where to send Notifications (e.g. via "altNotifIpv4Addrs" or "altNotifIpv6Addrs" attributes received when the subscription was created), the SMF shall exchange the authority part of the Notification URI with one of those addresses and shall use that URI in any subsequent communication. If the SMF received a "404 Not found" response, the SMF should resend the failed notification to that URI.

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

#### 4.2.3.1 General

This service operation is used by an NF service consumer to subscribe for event notifications on a specified PDU Session, or for all PDU Sessions of one UE, group of UE(s) or any UE, or to modify an existing subscription. The following are the types of events for which a subscription can be made:

- UP path change;

- PDU Session release;

- Change of Access Type;

- PLMN change;

- UE IP address change;

- Communication failure;

- if the "DownlinkDataDeliveryStatus" feature is supported, downlink data delivery status, and

- QoS flow level network data.

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

- creating a new subscription;

- modifying an existing subscription.

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

#### 4.2.3.2 Creating a new subscription

Figure 4.2.3.2-1 illustrates the creation of a subscription.



Figure 4.2.3.2-1: Creation of a subscription

To subscribe to event notifications, the NF service consumer shall send an HTTP POST request with: "{apiRoot}/nsmf-event-exposure/v1/subscriptions/" as Resource URI and the NsmfEventExposure data structure as request body that shall include:

- if the subscription applies to events related to a single PDU session, the PDU Session ID of that PDU session as "pduSeId" attribute;

- if the subscription applies to events not related to a single PDU session, identification of UEs to which the subscription applies via:

a) identification of a single UE by SUPI as "supi" attribute;

b) identification of a group of UE(s) via a "groupId" attribute; or

c) identification of any UE using a specific DNN via the "dnn" attribute;

NOTE 1: The identification of any UE does not apply for local breakout roaming scenarios where the SMF is located in the VPLMN and the NF service consumer is located in the HPLMN.

- an 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

NOTE 2: For the purpose of downlink data delivery failure notifications, the UDM as NF service consumer provides the corresponding AMF’s notification endpoint information in the "notifURI" attribute and in the "notifId" attribute.

- if the NF service consumer is an AMF, the GUAMI encoded as "guami" attribute:

- a description of the subscribed events as "eventSubs" attribute that for each event shall include:

a) an event identifier as "event" attribute; and

b) for event UP path change, whether the subscription is for early, late, or early and late notifications of UP path reconfiguration in the "dnaiChType" attribute;

and that may include:

a) for event "downlink data delivery status", the traffic descriptor(s) of the downlink data source in the "dddTraDescriptors" attribute; and

b) for event "downlink data delivery status", the subscribed delivery stati in the "ddsStati" attribute.

The NsmfEventExposure data structure as request body may also include:

- Alternate or backup IPv4 Addess(es) where to send Notifications encoded as " altNotifIpv4Addrs" attribute;

- Alternate or backup IPv6 Addess(es) where to send Notifications encoded as " altNotifIpv6Addrs" attribute;

- if the NF service consumer is an AMF, the name of a service produced by the AMF that expects to receive the notification about subscribed events encoded as "serviceName" attribute;

- Immediate reporting flag as "ImmeRep" attribute;

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

- Maximum Number of Reports as "maxReportNbr" attribute;

- Monitoring Duration as "expiry" attribute;

- Repetition Period for periodic reporting as "repPeriod" attribute;

- sampling ratio as "sampRatio" attribute; and/or

- group reporting guard time as "grpRepTime" attribute.

Upon the reception of an HTTP POST request with: "{apiRoot}/nsmf-event-exposure/v1/subscriptions/" as Resource URI and NsmfEventExposure data structure as request body, the SMF shall:

- create a new subscription;

- assign a subscription correlation ID;

- select an expiry time that is equal or less than a possible expiry time in the request;

- store the subscription;

- send a HTTP "201 Created" response with NsmfEventExposure data structure as response body and a Location header field containing the URI of the created individual subscription resource, i.e. {apiRoot}/nsmf-event-exposure/v1/subscriptions/{subId};

- if the "ImmeRep" attribute is included and set to true in the request, the SMF shall report the curret available value(s) for the subscribed event(s) as defined in subclause 4.2.3.1;

- if the sampling ratio as the "sampRatio" attribute is included in the subscription, the SMF shall select a random subset of UEs among target UEs according to the sampling ratio and only report the event(s) related to the selected subset UEs; and

- When the group reporting guard time as the "grpRepTime" attribute is included in the subscription, the SMF shall accumulate all of the event reports for the target UEs until the group reporting guard time expires. Then the SMF shall notify the NF service consumer using the Nsmf\_EventExposure\_Notify service operation, as described in subclause 4.2.2.2.

If the SMF received an GUAMI, the SMF may subscribe to GUAMI changes using the AMFStatusChange service operation of the Namf\_Communication service specified in 3GPP TS 29.518 [13], and it may use the Nnrf\_NFDiscovery Service specified in 3GPP TS 29.510 [12] (using the obtained GUAMI and possibly service name) to query the other AMFs within the AMF set.

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

### 5.6.1 General

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

Table 5.6.1-1 specifies the data types defined for the Nsmf\_EventExposure service based interface protocol.

Table 5.6.1-1: Nsmf\_EventExposure specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| EventNotification | 5.6.2.5 | Describes notifications about a single event that occurred. |  |
| EventSubscription | 5.6.2.4 | Represents the subscription to a single event |  |
| NotificationMethod | 5.6.3.4 | Represents the notification methods that can be subscribed |  |
| NsmfEventExposure | 5.6.2.2 | Represents an Individual SMF Notification Subscription resource |  |
| NsmfEventExposureNotification | 5.6.2.3 | Describes Notifications about events that occurred. |  |
| SmfEvent | 5.6.3.3 | Represents the types of events that can be subscribed |  |
| SubId | 5.6.3.2 | Identifies an Individual SMF Notification Subscription. |  |

Table 5.6.1-2 specifies data types re-used by the Nsmf\_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 Nsmf\_EventExposure service based interface.

Table 5.6.1-2: Nsmf\_EventExposure re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| AccessType | 3GPP TS 29.571 [11] |  |  |
| AfResultInfo | 3GPP TS 29.522 [20] | Represents application handling information. |  |
| CommunicationFailure | 3GPP TS 29.518 [TS29518] | Represents the communication failure information. | CommunicationFailure |
| DateTime | 3GPP TS 29.571 [11] |  |  |
| DlDataDeliveryStatus | 3GPP TS 29.571 [11] | Status of downlink data delivery | DownlinkDataDeliveryStatus |
| DddTrafficDescriptor | 3GPP TS 29.571 [11] | Traffic descriptor of source of downlink data | DownlinkDataDeliveryStatus |
| Dnai | 3GPP TS 29.571 [11] |  |  |
| DnaiChangeType | 3GPP TS 29.571 [11] | Describes the types of DNAI change. |  |
| Dnn | 3GPP TS 29.571 [11] |  |  |
| DurationSec | 3GPP TS 29.571 [11] |  |  |
| Gpsi | 3GPP TS 29.571 [11] |  |  |
| GroupId | 3GPP TS 29.571 [11] |  |  |
| Guami | 3GPP TS 29.571 [11] | Globally Unique AMF Identifier |  |
| Ipv4Addr | 3GPP TS 29.571 [11] |  |  |
| Ipv6Addr | 3GPP TS 29.571 [11] |  |  |
| Ipv6Prefix | 3GPP TS 29.571 [11] |  |  |
| MacAddr48 | 3GPP TS 29.571 [11] | MAC Address. |  |
| PduSessionId | 3GPP TS 29.571 [11] |  |  |
| PlmnId | 3GPP TS 29.571 [11] |  |  |
| ProblemDetails | 3GPP TS 29.571 [11] |  |  |
| RouteToLocation | 3GPP TS 29.571 [11] | A traffic route to/from an DNAI |  |
| SamplingRatio | 3GPP TS 29.571 [11] | Sampling Ratio. |  |
| ServiceName | 3GPP TS 29.510 [12] | Name of the service instance. |  |
| Supi | 3GPP TS 29.571 [11] |  |  |
| SupportedFeatures | 3GPP TS 29.571 [11] | Used to negotiate the applicability of the optional features defined in table 5.8-1. |  |
| Uinteger | 3GPP TS 29.571 [11] |  |  |
| Uri | 3GPP TS 29.571 [11] |  |  |

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

#### 5.6.2.4 Type EventSubscription

Table 5.6.2.4-1: Definition of type EventSubscription

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| event | SmfEvent | M | 1 | Subscribed events |  |
| dnaiChType | DnaiChangeType | C | 0..1 | For event UP path change, this attribute indicates whether the subscription is for early, late, or early and late DNAI change notification shall be supplied. |  |
| dddTraDescriptors | array(DddTrafficDescriptor) | C | 1..N | The traffic descriptor(s) of the downlink data source. May be included for event "downlink data delivery status". | DownlinkDataDeliveryStatus |
| dddStati | array(DlDataDeliveryStatus) | C | 1..N | May be included for event "downlink data delivery status". The subscribed stati (discarded, transmitted, buffered) for the event. If omitted all stati are subscribed. | DownlinkDataDeliveryStatus |

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

#### 5.6.2.5 Type EventNotification

Table 5.6.2.5-1: Definition of type EventNotification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| event | SmfEvent | M | 1 | Event that is notified. |  |
| timeStamp | DateTime | M | 1 | Time at which the event is observed. |  |
| supi | Supi | C | 0..1 | Subscription Permanent Identifier. It is included when the subscription applies to a group of UE(s) or any UE. |  |
| gpsi | Gpsi | C | 0..1 | Identifies a GPSI. It shall contain an MSISDN. It is included when it is available and the subscription applies to a group of UE(s) or any UE. |  |
| sourceDnai | Dnai | C | 0..1 | Source DN Access Identifier. Shall be included for event "UP\_PATH\_CH" if the DNAI changed (NOTE 1, NOTE 2). |  |
| targetDnai | Dnai | C | 0..1 | Target DN Access Identifier. Shall be included for event "UP\_PATH\_CH" if the DNAI changed (NOTE 1, NOTE 2). |  |
| dnaiChgType | DnaiChangeType | C | 0..1 | DNAI Change Type. Shall be included for event "UP\_PATH\_CH". |  |
| sourceUeIpv4Addr | Ipv4Addr | O | 0..1 | The IPv4 Address of the served UE for the source DNAI. May be included for event "UP\_PATH\_CH". |  |
| sourceUeIpv6Prefix | Ipv6Prefix | O | 0..1 | The Ipv6 Address Prefix of the served UE for the source DNAI. May be included for event "UP\_PATH\_CH". |  |
| targetUeIpv4Addr | Ipv4Addr | O | 0..1 | The IPv4 Address of the served UE for the target DNAI. May be included for event "UP\_PATH\_CH". |  |
| targetUeIpv6Prefix | Ipv6Prefix | O | 0..1 | The Ipv6 Address Prefix of the served UE for the target DNAI. May be included for event "UP\_PATH\_CH". |  |
| sourceTraRouting | RouteToLocation | C | 0..1 | N6 traffic routing information for the source DNAI. Shall be included for event "UP\_PATH\_CH" if available (NOTE 2). |  |
| targetTraRouting | RouteToLocation | C | 0..1 | N6 traffic routing information for the target DNAI. Shall be included for event "UP\_PATH\_CH" if available (NOTE 2). |  |
| ueMac | MacAddr48 | O | 0..1 | UE MAC address. May be included for event "UP\_PATH\_CH". |  |
| adIpv4Addr | Ipv4Addr | O | 0..1 | Added IPv4 Address(es). May be included for event "UE\_IP\_CH". |  |
| adIpv6Prefix | Ipv6Prefix | O | 0..1 | Added Ipv6 Address Prefix(es). May be included for event "UE\_IP\_CH". |  |
| reIpv4Addr | Ipv4Addr | O | 0..1 | Removed IPv4 Address(es). May be included for event "UE\_IP\_CH". |  |
| reIpv6Prefix | Ipv6Prefix | O | 0..1 | Removed Ipv6 Address Prefix(es). May be included for event "UE\_IP\_CH". |  |
| plmnId | PlmnId | C | 0..1 | New PLMN ID. Shall be included for event "PLMN\_CH". |  |
| accType | AccessType | C | 0..1 | New Access Type. Shall be included for event "AC\_TY\_CH". |  |
| pduSeId | PduSessionId | C | 0..1 | PDU session ID. Shall be included for event "PDU\_SES\_REL". |  |
| dddStatus | DlDataDeliveryStatus | C | 0..1 | Downlink data delivery status (discarded, transmitted, buffered). Shall be included for event "downlink data delivery status", | DownlinkDataDeliveryStatus |
| maxWaitTime | DateTime | C | 0..1 | The estimated maximum waiting time for downlink data delivery, Shall be included for event "downlink data delivery status" with status "BUFFERED". | DownlinkDataDeliveryStatus |
| dddTraDescriptor | DddTrafficDescriptor | C | 0..1 | The downlink data descriptor impacted by downlink data delivery status change. Shall be included for event "downlink data delivery status" | DownlinkDataDeliveryStatus |
| commFailure | CommunicationFailure | C | 0..1 | Describes the communication failure cause for the UE. Shall be included for event "COMM\_FAIL". | CommunicationFailure |
| NOTE 1: If the DNAI is not changed while the N6 traffic routing information is changed, the "sourceDnai" attribute and "targetDnai" attribute shall not be provided.  NOTE 2: The change from the UP path status where no DNAI applies to a status where a DNAI applies indicates the activation of the related AF request and therefore only the target DNAI and N6 traffic routing information is provided in the event notification; the change from the UP path status where a DNAI applies to a status where no DNAI applies indicates the de-activation of the related AF request and therefore only the source DNAI and N6 traffic routing information is provided in the event notification. | | | | | |

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

#### 5.6.2.6 void.



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

#### 5.6.3.5 void



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

# A.2 Nsmf\_EventExposure API

openapi: 3.0.0

info:

version: 1.1.0.alpha-3

title: Nsmf\_EventExposure

description: |

Session Management Event Exposure Service.

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externalDocs:

description: 3GPP TS 29.508 V16.2.0; 5G System; Session Management Event Exposure Service.

url: http://www.3gpp.org/ftp/Specs/archive/29\_series/29.508/

servers:

- url: '{apiRoot}/nsmf\_event-exposure/v1'

variables:

apiRoot:

default: https://example.com

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

security:

- {}

- oAuth2ClientCredentials:

- nsmf-event-exposure

paths:

/subscriptions:

post:

operationId: CreateIndividualSubcription

summary: Create an individual subscription for event notifications from the SMF

tags:

- Subscriptions (Collection)

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'201':

description: Success

headers:

Location:

description: 'Contains the URI of the newly created resource, according to the structure: {apiRoot}/nsmf-event-exposure/v1/subscriptions/{subId}'

required: true

schema:

type: string

content:

application/json:

schema:

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

'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/NsmfEventExposureNotification'

responses:

'204':

description: No Content, Notification was succesfull

'307':

description: temporary redirect

'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:

afAcknowledgement:

'{request.body#/ackUri}':

post:

requestBody: # contents of the callback message

required: true

content:

application/json:

schema:

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

responses:

'204':

description: No Content (successful acknowledgement)

'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/{subId}:

get:

operationId: GetIndividualSubcription

summary: Read an individual subscription for event notifications from the SMF

tags:

- IndividualSubscription (Document)

parameters:

- name: subId

in: path

description: Event Subscription ID

required: true

schema:

type: string

responses:

'200':

description: OK. Resource representation is returned

content:

application/json:

schema:

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

'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:

operationId: ReplaceIndividualSubcription

summary: Replace an individual subscription for event notifications from the SMF

tags:

- IndividualSubscription (Document)

requestBody:

required: true

content:

application/json:

schema:

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

parameters:

- name: subId

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/NsmfEventExposure'

'204':

description: No Content. Resource was succesfully modified

'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:

operationId: DeleteIndividualSubcription

summary: Delete an individual subscription for event notifications from the SMF

tags:

- IndividualSubscription (Document)

parameters:

- name: subId

in: path

description: Event Subscription ID

required: true

schema:

type: string

responses:

'204':

description: No Content. Resource was succesfully deleted

'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:

nsmf-event-exposure: Access to the Nsmf\_EventExposure API

schemas:

NsmfEventExposure:

description: Represents an Individual SMF Notification Subscription resource. The serviveName property corresponds to the serviceName in the main body of the specification.

type: object

properties:

supi:

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

gpsi:

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

anyUeInd:

type: boolean

description: Any UE indication. This IE shall be present if the event subscription is applicable to any UE. Default value "FALSE" is used, if not present.

groupId:

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

pduSeId:

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

subId:

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

notifId:

type: string

description: Notification Correlation ID assigned by the NF service consumer.

notifUri:

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

altNotifIpv4Addrs:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

description: Alternate or backup IPv4 Addess(es) where to send Notifications.

minItems: 1

altNotifIpv6Addrs:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

description: Alternate or backup IPv6 Addess(es) where to send Notifications.

minItems: 1

eventSubs:

type: array

items:

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

minItems: 1

description: Subscribed events

ImmeRep:

type: boolean

notifMethod:

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

maxReportNbr:

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

expiry:

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

repPeriod:

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

guami:

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

serviveName:

$ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/ServiceName'

supportedFeatures:

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

sampRatio:

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

grpRepTime:

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

required:

- notifId

- notifUri

- eventSubs

NsmfEventExposureNotification:

type: object

properties:

notifId:

type: string

description: Notification correlation ID

eventNotifs:

type: array

items:

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

minItems: 1

description: Notifications about Individual Events

ackUri:

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

required:

- notifId

- eventNotifs

EventSubscription:

type: object

properties:

event:

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

dnaiChgType:

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

dddTraDescriptors:

type: array

items:

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

minItems: 1

dddStati:

type: array

items:

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

minItems: 1

required:

- event

EventNotification:

type: object

properties:

event:

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

timeStamp:

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

supi:

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

gpsi:

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

sourceDnai:

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

targetDnai:

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

dnaiChgType:

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

sourceUeIpv4Addr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

sourceUeIpv6Prefix:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

targetUeIpv4Addr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

targetUeIpv6Prefix:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

sourceTraRouting:

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

targetTraRouting:

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

ueMac:

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

adIpv4Addr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

adIpv6Prefix:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

reIpv4Addr:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

reIpv6Prefix:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

plmnId:

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

accType:

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

pduSeId:

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

dddStatus:

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

dddTraDescriptor:

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

maxWaitTime:

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

commFailure:

$ref: 'TS29518\_Namf\_EventExposure.yaml#/components/schemas/CommunicationFailure'

required:

- event

- timeStamp

SubId:

type: string

format: SubId

description: Identifies an Individual SMF Notification Subscription. To enable that the value is used as part of a URI, the string shall only contain characters allowed according to the "lower-with-hyphen" naming convention defined in 3GPP TS 29.501 [2]. In an OpenAPI [10] schema, the format shall be designated as "SubId".

AckOfNotify:

type: object

properties:

notifId:

type: string

ackResult:

$ref: 'TS29522\_TrafficInfluence.yaml#/components/schemas/AfResultInfo'

supi:

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

gpsi:

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

required:

- notifId

- ackResult

SmfEvent:

anyOf:

- type: string

enum:

- AC\_TY\_CH

- UP\_PATH\_CH

- PDU\_SES\_REL

- PLMN\_CH

- UE\_IP\_CH

- DDDS

- COMM\_FAIL

- 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

- AC\_TY\_CH: Access Type Change

- UP\_PATH\_CH: UP Path Change

- PDU\_SES\_REL: PDU Session Release

- PLMN\_CH: PLMN Change

- UE\_IP\_CH: UE IP address change

- DDDS: Downlink data delivery status

- COMM\_FAIL: Communication Failure

NotificationMethod:

anyOf:

- type: string

enum:

- PERIODIC

- ONE\_TIME

- ON\_EVENT\_DETECTION

- 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

- PERIODIC

- ONE\_TIME

- ON\_EVENT\_DETECTION

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