**3GPP TSG-CT3 Meeting #112e C3-205049\_r1**

**E-Meeting, 04th – 13th November 2020**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **29.517** | **CR** | **0021** | **rev** | **1** | **Current version:** | **16.2.0** |  |
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| *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:*** | Essential corrections and alignments | | | | | | | | | |
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| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | SBIProtoc16 | | | | |  | ***Date:*** | | | 2020-10-?? |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The following corrections and alignments are necessary:   * "204 No Content" needs to be added as a possible response code in clause 4.2.2.3 (Modifying an existing subscription) in order to align with clause 5.3.3.3.2 and Table 5.3.3.3.2-3. * The "Resource URI" column of Table 5.3.1-1 should contain a "<relative URI below root>" instead of a full resource URI, as per the API TS skeleton provided in TS 29.501. * Event type "Service Experience information" is named this way in most parts of this specification, except in clauses 4.1.1 and 4.2.2.1 where it is named "Service data". | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | * Add "204 No Content" as a possible response code in clause 4.2.2.3 (Modifying an existing subscription) in order to align with clause 5.3.3.3.2 and Table 5.3.3.3.2-3. * Update the "Resource URI" column of Table 5.3.1-1 by replacing the full resource URI with the associated "<relative URI below root>", i.e. by removing the part "{apiRoot}/<apiName>/<apiVersion>". * Harmonize the naming of Event type "Service Experience information" across the specifications. * Additional editorial corrections and improvements. | | | | | | | | |
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| ***Consequences if not approved:*** | | Necessary corrections are not applied. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.1.1, 4.1.2, 4.1.3.1, 4.1.3.2, 4.2.2.1, 4.2.2.2, 4.2.2.3, 4.2.3.2, 4.2.4.2, 5.3.1, 5.3.2.2, 5.3.3.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 does not impact OpenAPI specifications files. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev 1:   * Revert the changes on "subclause" (to "clause") to keep the existing wording. * Revert some unecessary changes in clause 4.2.2.2 and clause 4.1.3.1. * Update the changes to the resource URIs in clause 5.3.3.4.1 and clause 5.3.1 by removing the solidus. | | | | | | | | |

\* \* \* Start of changes \* \* \* \*

4.1.1 Overview

The Application Function Exposure Service, as defined in 3GPP TS 23.502 [3] and 3GPP TS 23.288 [4], is provided by the Application Function (AF).

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 AF.

The types of observed events include:

- Service Experience information for an application;

- UE mobility information;

- UE communication information; and

- Exceptions information.

When the event to which the NF service consumer has subscribed occurs, the AF reports the requested information to the NF service consumer based on the event reporting information definition requested by the NF service consumer (see 3GPP TS 23.502 [3]).

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

### 4.1.2 Service Architecture

The Data Analytics Architecture is defined in 3GPP TS 23.288 [4].

The Application Function Exposure Service (Naf\_EventExposure) is part of the Naf service-based interface exhibited by the Application Function (AF).

The known NF service consumers of the Naf\_EventExposure service are the Network Exposure Function (NEF) and the Network Data Analytics Function (NWDAF).

The Naf\_EventExposure service is provided by the AF and consumed by NF service consumers (e.g. NEF, NWDAF), as shown in figure 4.1.2-1 for the SBI representation model and in figure 4.1.2-2 for reference point representation model.



Figure 4.1.2-1: Naf\_EventExposure service Architecture, SBI representation



Figure 4.1.2-2: Naf\_EventExposure service Architecture, reference point representation

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

#### 4.1.3.1 Application Function (AF)

The AF is a functional element that provides service or application related information to NF service consumers.

The AF allows NF service consumers to subscribe to and/or unsubscribe from periodic notifications and/or notifications related to the detection of subscribed event.

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

#### 4.1.3.2 NF Service Consumers

The Network Data Analytics Function (NWDAF):

- supports (un)subscribing to notifications of subscribed event(s) from the AF;

- supports receiving the notifications of subscribed event(s) from the AF.

The Network Exposure Function (NEF):

- supports (un)subscribing to notifications of service experience information from the AF;

- supports receiving the notifications of subscribed event(s) from the AF.

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

4.2.2.1 General

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

The following are the types of events for which a subscription can be made:

- Service Experience informationfor an application;

- UE mobility information;

- UE communication information; and

- Exceptions information.

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

- creating a new subscription;

- modifying an existing subscription.

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

4.2.2.2 Creating a new subscription

Figure 4.2.2.2-1 illustrates the creation of a subscription.

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**Figure 4.2.2.2-1: Creation of a subscription**

To subscribe to event notifications, the NF service consumer shall send an HTTP POST request to the AF with: "{apiRoot}/naf-eventexposure/<apiVersion>/subscriptions/" as request URI as shown in step 1 of figure 4.2.2.2-1, and the "AfEventExposureSubsc" data structure as request body.

The "AfEventExposureSubsc" data structure shall include:

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

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

- 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.

The "EventsSubs" data shall include:

- a event to subscribe 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; and/or

- group reporting guard time as "grpRepTime" attribute.

The "eventFilter" shall include:

- identification of target UE(s) to which the subscription applies via :

1) identification of individual UE(s) via "gpsis" attribute or "supis" attribute; or

2) identification of group(s) of UE(s) via "exterGroupIds" attribute or "interGroupIds" attribute; or

3) identification of any UE via "anyUeInd" attribute.

Depending on the event type:

- if the feature "ServiceExperience" is supported and the event is "SVC\_EXPERIENCE", the "eventFilter" attribute may provide:

1) identification of application to which the subscription applies via "appIds" attribute;

2) an area of interest via "locArea" attribute.

- if the feature "Exceptions" is supported and the event is "EXCEPTIONS", the "eventFilter" attribute may provide:

1) identification of application to which the subscription applies via "appIds" attribute;

2) an area of interest via "locArea" attribute;

- if the feature "UeCommunication" is supported and the event is "UE\_COMM", the "eventFilter" attribute may provide:

1) identification of application to which the subscription applies via "appIds" attribute;

2) an area of interest via "locArea" attribute.

- if the feature "UeMobility" is supported and the event is "UE\_MOBILITY", the "eventFilter" attribute may provide:

1) identification of application to which the subscription applies via "appIds" attribute;

2) an area of interest via "locArea" attribute.

If the AF cannot successfully fulfil the received HTTP POST request due to an internal error or an error in the HTTP POST request, the AF shall send the HTTP error response as specified in subclause 5.7.

Upon successful reception of the HTTP POST request with "{apiRoot}/naf-eventexposure/<apiVersion>/subscriptions/" as request URI and "AfEventExposureSubsc" data structure as request body, the AF shall create a new "Individual Application Event Subscription" resource, store the subscription and send an HTTP "201 Created" response as shown in step 2 of figure 4.2.2.2-1, containing:

- a Location header field; and

- an "AfEventExposureSubsc" 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}/naf-eventexposure/<apiVersion>/subscriptions/{subscriptionId}".

The "AfEventExposureSubsc" data type payload body shall contain the representation of the created "Individual Application Event Subscription".

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

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

When the sampling ratio as, "sampRatio" attribute, is included in the subscription, the AF 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.

When the group reporting guard time as the "grpRepTime" attribute is included in the subscription, the AF shall accumulate all the event reports for the target UEs until the group reporting guard time expires. Then the AF shall notify the NF service consumer using the Naf\_EventExposure\_Notify service operation, as described in subclause 4.2.4.2.

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

4.2.2.3 Modifying an existing subscription

Figure 4.2.2.3-1 illustrates the modification of an existing subscription.

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**Figure 4.2.2.3-1: Modification of an existing subscription**

To modify an existing subscription to event notifications, the NF service consumer shall send an HTTP PUT request with: "{apiRoot}/naf-eventexposure/<apiVersion>/subscriptions/{subscriptionId}" as request URI, as shown in step 1 of figure 4.2.2.3-1, where "{subscriptionId}" is the subscription correlation ID of the existing subscription. The "AfEventExposureSubsc" data structure is included as request body as described in subclause 4.2.2.2.

NOTE 1: An alternate NF service consumer than the one that requested the generation of the subscription resource can send the PUT request.

NOTE 2: The "notifUri" attribute within the AfEventExposureSubsc data structure can be modified to request that subsequent notifications are sent to a new NF service consumer.

NOTE 3: The "monDur" attribute within the AfEventExposureSubsc data structure can be modified to extend the expiry time to keep receiving notifications.

If the AF cannot successfully fulfil the received HTTP PUT request due to an internal error or an error in the HTTP PUT request, the AF shall send an HTTP error response as specified in subclause 5.7.

Upon successful reception of an HTTP PUT request with: "{apiRoot}/naf-eventexposure/<apiVersion>/subscriptions/{subscriptionId}" as request URI and "AfEventExposureSubsc" data structure as request body, the AF shall update the subscription and send either a HTTP "200 OK" response with the "AfEventExposureSubsc" data structure as response body containing the representation of the modified "Individual Application Event Subscription", or an HTTP "204 No Content" response, as shown in step 2 of figure 4.2.2.3-1.

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

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

When the sampling ratio, as "sampRatio" attribute, is included in the subscription, the AF 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.

When the group reporting guard time, as "grpRepTime" attribute, is included in the subscription, the AF shall accumulate all the event reports for the target UEs until the group reporting guard time expires. Then, the AF shall notify the NF service consumer using the Naf\_EventExposure\_Notify service operation, as described in subclause 4.2.4.2.

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

#### 4.2.3.2 Unsubscription from event notifications

Figure 4.2.3.2-1 illustrates the unsubscription from event notifications.



Figure 4.2.3.2-1: Unsubscription from event notifications

To unsubscribe from event notifications, the NF service consumer shall send an HTTP DELETE request with "{apiRoot}/naf-eventexposure/<apiVersion>/subscriptions/{subscriptionId}" as request URI, as shown in step 1 of figure 4.2.3.2-1, where "{subscriptionId}" is the subscription correlation identifier of the existing resource subscription that is to be deleted.

If the AF cannot successfully fulfil the received HTTP DELETE request due to an internal error or an error in the HTTP DELETE request, the AF shall send an HTTP error response as specified in subclause 5.7.

Upon successful reception of the HTTP DELETE request with: "{apiRoot}/naf-eventexposure/<apiVersion>/subscriptions/{subscriptionId}" as request URI, the AF shall remove the corresponding subscription and send an HTTP "204 No Content" response as shown in step 2 of figure 4.2.3.2-1.

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

#### 4.2.4.2 Notification about subscribed events

Figure 4.2.4.2-1 illustrates the notification about subscribed events.



Figure 4.2.4.2-1: Notification about subscribed events

If the AF observes application related event(s) for which an NF service consumer has subscribed, the AF shall send an HTTP POST request as shown in step 1 of figure 4.2.4.2-1, with the "{notifUri}" as request URI containing the value previously provided by the NF service consumer within the corresponding subscription, and the "AfEventExposureNotif" data structure.

The "AfEventExposureNotif" data structure shall include:

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

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

1) the application related event as "event" attribute;

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

3) if the "event" attribute is "SVC\_EXPERIENCE":

- service experience information about the application involved in the reported event in the "svcExprcInfos" attribute;

4) if the "event" attribute is "UE\_MOBILITY":

- UE mobility information associated with the application as "ueMobilityInfos" attribute;

5) if the "event" attribute is "UE\_COMM":

- application communication information associated with the application as "ueCommInfos" attribute; and

6) if the "event" attribute is "EXCEPTIONS":

- exceptions information associated with a service flow as "excepInfos" 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 subclause 5.7.

Upon successful reception of the HTTP POST request with "{notifUri}" as request URI and "AfEventExposureNotif" data structure as request body, the NF service consumer shall send a "204 No Content" HTTP response, as shown in step 2 of figure 4.2.4.2-1.

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

5.3.1 Resource Structure

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**Figure 5.3.1-1: Resource URI structure of the Naf\_EventExposure API**

Table 5.3.1-1 provides an overview of the resources and applicable HTTP methods.

**Table 5.3.1-1: Resources and methods overview**

|  |  |  |  |
| --- | --- | --- | --- |
| **Resource name** | **Resource URI** | **HTTP method or custom operation** | **Description** |
| Application Event Subscriptions | /subscriptions | POST | Subscription to the notification of application events and creation of an Individual Application Event Subscription resource. |
| Individual Application Event Subscription | /subscriptions/ {subscriptionId} | GET | Reads an Individual Application Event Subscription resource. |
| PUT | Modifies an Individual Application Event Subscription. |
| DELETE | Cancels an individual subscription to notifications of application event. |

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

5.3.2.2 Resource definition

Resource URI: **{apiRoot}/naf-eventexposure/<apiVersion>/subscriptions/**

This resource shall support the resource URI variables defined in table 5.3.2.2-1.

**Table 5.3.2.2-1: Resource URI variables for this resource**

|  |  |  |
| --- | --- | --- |
| **Name** | **Data type** | **Definition** |
| apiRoot | string | See subclause 5.1 |
| apiVersion | string | See subclause 5.1 |

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

5.3.3.2 Resource definition

Resource URI: **{apiRoot}/naf-eventexposure/<apiVersion>/subscriptions/{subscriptionId}**

This resource shall support the resource URI variables defined in table 5.3.3.2-1.

**Table 5.3.3.2-1: Resource URI variables for this resource**

|  |  |  |
| --- | --- | --- |
| **Name** | **Data type** | **Definition** |
| apiRoot | string | See subclause 5.1 |
| apiVersion | string | See subclause 5.1 |
| subscriptionId | string | Identifies a subscription to the AF event exposure service. |

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