**3GPP TSG-CT WG4 Meeting #101eC4-205abc**

**E-Meeting, 03rd – 13th November 2020 *was* C4-205091**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.503** | **CR** | **0498** | **rev** | **1** | **Current version:** | **16.5.0** |  |
|  | | | | | | | | |
| *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:*** | Subscription applies also to EPC in EE service | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | CT4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | UDICOM | | | | |  | ***Date:*** | | | 2020-10-23 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | In stage 2 specification clause 5.6.2, it mentions:  *1. The UDM receives a request from a combined SCEF+NEF to configure a monitoring event for a UE. The request indicates that the subscription applies also to EPC and the monitoring event is to be reported by the MME (e.g. location change). The request includes the notification addresses of both the NEF and the SCEF.*  *2. The UDM configures the monitoring event for the UE in 5GC. If the 5GS UDR is used, the UDM stores the configuration of the monitoring event for the UE in the 5GS-UDR. The UDM contacts the corresponding NF within the 5GC (e.g. AMF, SMF) as required by the monitoring event.*  *3. Unless the subscription information related to the UE indicates that the UE has no EPC subscription data, then the UDM requests the HSS to configure the monitoring event for the UE in EPC using a Nhss\_EventExposure\_Subscribe operation. In addition to the UDM notification address, the UDM provides the SCEF notification address (i.e. SCEF Id).4. The HSS configures the monitoring event for the UE in EPC using the procedures defined in 3GPP TS 23.682 [16].*  *5. The HSS replies to the UDM with the result of the subscription request.*  *6. The UDM replies to the combined SCEF+NEF including confirmation that the subscription was also successful in EPC domain.*  The parameters related to whether the subscription applies also to EPC are missing in existiong definition of EE subscription service operation.  and  The parameters related to confirmation that the subscription was also successful in EPC domain are also missing in existiong definition of response of EE subscription service operation. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Added the parameters related to whether the subscription applies also to EPC.   1. Added the text related to whether the subscription applies also to EPC in description of service Subscription to Notification of event occurrence in clause 5.5.2.2.2. 2. Added attributes epcAppliedInd, scefId in data model EeSubscription 3. Added attribute reportedByMmeInd in data model MonitoringConfiguration | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The missing paramters related to 4G in EE subscribe service operation will result in that Common Network Exposure Scenarios is not implemented completely. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.5.2.2.2, 6.4.6.1, 6.4.6.2.2, 6.4.6.2.9, A.5 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 will introduce backward compatible corrections in the OpenAPI specification file of TS29503\_Nudm\_EE OpenAPI, TS29504\_Nudr\_DR OpenAPI. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev1:   1. Corrected TS29505\_Subscription\_Data to TS29504\_Nudr\_DR in ***Other comments:*** on cover sheet. 2. Added the scefDiamRealm, renamed scefId to scefDiamHost and improved the descrpition of scefDiamHost to cover the right scenario in data model EeSubscription. 3. Removed changes in 6.4.6.2.3 Type: MonitoringConfiguration 4. Added indication on whether the subscription was also successful in EPC domain in the response of NF service consumer subscribes to notifications service operation, i.e. added the related text in step 2a of clause 5.5.2.2.2, and added epcStatusInd in data model CreatedEeSubscription. | | | | | | | | |

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

##### 5.5.2.2.2 Subscription to Notification of event occurrence

Figure 5.5.2.2.2-1 shows a scenario where the NF service consumer sends a request to the UDM to subscribe to notifications of event occurrence (see also 3GPP TS 23.502 [3] figure 4.15.3.2.2-1 step 1 and 3GPP TS 23.502 [3] Figure 4.15.3.2.3b-1 step 1). The request contains a callback URI, the type of event that is monitored and additional information e.g. event filters and reporting options.



Figure 5.5.2.2.2-1: NF service consumer subscribes to notifications

1. The NF service consumer sends a POST request to the parent resource (collection of subscriptions) (.../{ueIdentity}/ee-subscriptions), to create a subscription as present in message body. The values ueIdentity shall take are specified in Table 6.4.3.2.2-1. The request may contain an expiry time, suggested by the NF Service Consumer, representing the time upto which the subscription is desired to be kept active and the time after which the subscribed event(s) shall stop generating notifications, the indication on whether the subscription applies also to EPC.

2a. On success, the UDM responds with "201 Created" with the message body containing a representation of the created subscription. The Location HTTP header shall contain the URI of the created subscription. If the event subscription was for a group of UEs:

- The "maxNumOfReports" in the "reportingOptions" IE shall be applicable to each UE in the group;

- The UDM shall return the number of UEs in that group in the "numberOfUes" IE.

The NF service consumer shall keep track of the maximum number of reports reported for each UE in the event report and when "maxNumOfReports\*numberOfUes" limit is reached, the NF service consumer shall initiate the unsubscription of the notification towards the UDM (see clause 5.5.2.3.2).

The response, based on operator policy, may contain the expiry time, as determined by the UDM, after which the subscription becomes invalid. Once the subscription expires, if the NF Service Consumer wants to keep receiving notifications, it shall create a new subscription in the UDM. The NF Service Producer shall not provide the same expiry time for many subscriptions in order to avoid all of them expiring and recreating the subscription at the same time. If the expiry time is not included in the response, the NF Service Consumer shall not associate an expiry time for the subscription.

If the indication on whether the subscription applies also to EPC is included in the request, the response shall include the indication on whether the subscription was also successful in EPC domain.

2b. If the user does not exist, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

2c. If there is no valid subscription data for the UE, i.e. based on the UE's subscription information monitoring of the requested EventType is not allowed, or the requested EventType is not supported, HTTP status code "403 Forbidden" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the POST response body.

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

#### 6.4.6.1 General

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

Table 6.4.6.1-1 specifies the data types defined for the Nudm\_EE service API.

Table 6.4.6.1-1: Nudm\_EE specific Data Types

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Data type | | Clause defined | | Description | |
| EeSubscription | | 6.4.6.2.2 | | A subscription to Notifications | |
| MonitoringConfiguration | | 6.4.6.2.3 | | Monitoring Configuration | |
| MonitoringReport | | 6.4.6.2.4 | | Monitoring Report | |
| Report | | 6.4.6.2.5 | |  | |
| ReportingOptions | | 6.4.6.2.6 | |  | |
| ChangeOfSupiPeiAssociationReport | | 6.4.6.2.7 | |  | |
| RoamingStatusReport | | 6.4.6.2.8 | |  | |
| CreatedEeSubscription | | 6.4.6.2.9 | |  | |
| LocationReportingConfiguration | | 6.4.6.2.10 | |  | |
| CnTypeChangeReport | | 6.4.6.2.11 | |  | |
| ReachabilityForSmsReport | | 6.4.6.2.12 | |  | |
| DatalinkReportingConfiguration | | 6.4.6.2.13 | | Reporting configuration for events related to data link | |
| CmInfoReport | | 6.4.6.2.14 | | Reporting UE's Connection Management State information per access type | |
| LossConnectivityCfg | | 6.4.6.2.15 | | Configuration for loss of connectivity event | |
| MaxNumOfReports | | 6.4.6.3.2 | | Maximum number of reports | |
| ReferenceId | | 6.4.6.3.2 | | Reference Identity | |
| EventType | | 6.4.6.3.3 | | Event type of UDM Event Exposure service | |
| LocationAccuracy | | 6.4.6.3.4 | | Location Accuracy definition | |
| CnType | | 6.4.6.3.5 | | Core Network Type | |
| AssociationType | | 6.4.6.3.6 | |  | |
| EventReportMode | | 6.4.6.3.7 | |  | |

Table 6.4.6.1-2 specifies data types re-used by the Nudm\_EE service API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nudm\_EE service API.

Table 6.4.6.1-2: Nudm\_EE re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| Uri | 3GPP TS 29.571 [7] | Uniform Resource Identifier |
| SupportedFeatures | 3GPP TS 29.571 [7] | see 3GPP TS 29.500 [4] clause 6.6 |
| DateTime | 3GPP TS 29.571 [7] |  |
| Pei | 3GPP TS 29.571 [7] |  |
| PlmnId | 3GPP TS 29.571 [7] |  |
| Gpsi | 3GPP TS 29.571 [7] |  |
| AccessType | 3GPP TS 29.571 [7] |  |
| PatchResult | 3GPP TS 29.571 [7] |  |
| DddTrafficDescriptor | 3GPP TS 29.571 [7] |  |
| SamplingRatio | 3GPP TS 29.571 [7] |  |
| DurationSec | 3GPP TS 29.571 [7] |  |
| DlDataDeliveryStatus | 3GPP TS 29.571 [7] | Downlink data delivery status |
| DiameterIdentity | 3GPP TS 29.571 [7] | Diameter Identify |
| CmInfo | 3GPP TS 29.518 [36] | Describe the Connection Management state information for an access type |

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

##### 6.4.6.2.2 Type: EeSubscription

Table 6.4.6.2.2-1: Definition of type EeSubscription

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| callbackReference | Uri | M | 1 | URI provided by the NF service consumer to receive notifications |
| monitoringConfigurations | map(MonitoringConfiguration) | M | 1..N | A map (list of key-value pairs where referenceId converted from integer to string serves as key; see clause 6.4.6.3.2) of MonitoringConfigurations;  see clause 6.4.6.2.3 |
| reportingOptions | ReportingOptions | O | 0..1 | This IE may be included if the NF service consumer wants to describe how the reports of the event to be generated. |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.4.8  These are the features supported by the NF subscribing at the UDM. |
| subscriptionId | string | C | 0..1 | This attribute shall be present if the EeSubscription is sent in a GET response message on Nudr. It identifies the individual EeSubscription stored in the UDR and may be used by the UDM to delete an EeSubscription. |
| contextInfo | ContextInfo | C | 0..1 | This IE if present may contain e.g. the headers received by the UDM along with the EeSubscription.  Shall be absent on Nudm and may be present on Nudr. |
| epcAppliedInd | boolean | O | 0..1 | This IE indicates whether the subscription applies also to EPC or not.  true: the subscription applies also to EPC.  false or absent: the subscription doesn't apply to EPC. |
| scefDiamHost | DiameterIdentity | C | 0..1 | This IE shall be included if parameter epcAppliedInd is set to true and at least one of the notification to subscription applied to EPC will be reported directly from the MME to the SCEF (e.g. event LOCATION\_REPORTING).  When present, it contains the Diameter Identify (FQDN) of the SCEF to which the monitered reports may be sent in EPC. |
| scefDiamRealm | DiameterIdentity | C | 0..1 | This IE shall be included if parameter epcAppliedInd is set to true and at least one of the notification to subscription applied to EPC will be reported directly from the MME to the SCEF (e.g. event LOCATION\_REPORTING).  When present, It contains the Diameter realm of the SCEF to which the monitered reports may be sent in EPC. |

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

##### 6.4.6.2.9 Type: CreatedEeSubscription

Table 6.4.6.2.9-1: Definition of type CreatedEeSubscription

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| eeSubscription | EeSubscription | M | 1 | This IE shall contain the representation of the created event subscription. |
| numberOfUes | Uinteger | C | 0..1 | This IE shall be included if the event subscription is for a group of UEs. When present, this IE shall represent the number of UEs in the group. |
| eventReports | array(MonitoringReport) | O | 1..N | This IE when present, shall contain the status of events that are requested for immediate reporting as well, if those events are available at the time of subscription. |
| epcStatusInd | boolean | C | 0..1 | This IE indicates whether the subscription was also successful in EPC domain or not.  true: the subscription was also successful in EPC domain.  false: the subscription was not successful in EPC domain.  This IE shall be included if epcAppliedInd is true in the subscription request. |

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

## A.5 Nudm\_EE API

openapi: 3.0.0

info:

version: '1.1.0'

title: 'Nudm\_EE'

description: |

Nudm Event Exposure Service.

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***(… text not shown for clarity …)***

CreatedEeSubscription:

type: object

required:

- eeSubscription

properties:

eeSubscription:

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

numberOfUes:

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

eventReports:

type: array

items:

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

minItems: 1

epcStatusInd:

type: boolean

EeSubscription:

type: object

required:

- callbackReference

- monitoringConfigurations

properties:

callbackReference:

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

monitoringConfigurations:

description: A map (list of key-value pairs where ReferenceId serves as key) of MonitoringConfigurations

type: object

additionalProperties:

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

minProperties: 1

reportingOptions:

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

supportedFeatures:

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

subscriptionId:

type: string

contextInfo:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/ContextInfo'

epcAppliedInd:

type: boolean

default: false

scefDiamHost:

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

scefDiamRealm:

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

MonitoringConfiguration:

type: object

required:

- eventType

properties:

eventType:

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

immediateFlag:

type: boolean

locationReportingConfiguration:

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

associationType:

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

datalinkReportCfg:

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

lossConnectivityCfg:

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

maximumLatency:

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

maximumResponseTime:

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

suggestedPacketNumDl:

type: integer

minimum: 1

***(… text not shown for clarity …)***

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*The end of changes\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*