**3GPP TSG-CT WG4 Meeting #105-eC4-214abc**

**E-Meeting, 17th – 27th August 2021 *was* C4-214483**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.563** | **CR** | **0049** | **rev** | **1** | **Current version:** | **17.1.0** |  |
|  | | | | | | | | |
| *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:*** | Partial success on EE subscription | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | C4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI17, 5G\_CIoT | | | | |  | ***Date:*** | | | 2021-08-09 |
|  |  | | | |  | |  | | |  |
| ***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 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:*** | | In the EPC, when the SCEF send the Configuration Information Request to the HSS for the configuration/deletion of Monitoring events for a UE, we can find the statements below in TS 29.336 clause 7.2.1.2    *If CIR message includes multiple SCEF Reference ID and one, several or all SCEF Reference ID Monitoring events cannot be handled, or fail to be configured at the registered serving node(s), the HSS shall report all SCEF Reference ID requested to the SCEF with an appropriate Experimental-Result-Code or Result-Code in the Monitoring-Event-Config-Status AVP(s).*  Based on the statement above, we can know that the HSS can report the handled results of monitoring configuration at *SCEF Reference Id* level including the succeeded ones and failed ones in HSS. But in the current definition of EE subscription in 29.563, the new SBI-based interface cannot be backward compatible with the legacy function. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Extend the response body of Subscribe service operation of EE service to include the information about the failed Monitoring Configurations and failed cause of them. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The HSS EE service can't be backward-compatible with the legacy function of reporting the results of the monitoring configuration including the succeeded ones and failed ones. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.5.2.2.2, 6.4.6.1, 6.4.6.2.3, 6.4.6.2.xx(new), 6.2.6.3.xx(new), 6.4.6.3.2, 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 introduces backward compatible new feature to the OpenAPI specification files of TS29563\_ Nhss\_EE API. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev1:   1. Fixed the cardinality issue of failedCause in table 6.4.6.2.xx-1. | | | | | | | | |

\* \* \* Begin 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 HSS to subscribe to notifications of event occurrence. The request contains a callback URI, the type of event that is monitored and additional information e.g. SCEF Id, 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) (.../{ueId}/ee-subscriptions), to create a subscription as present in message body. 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. Additionally, the request may include an SCEF Id if Common Network Exposure is used (i.e. if combined SCEF+NEF requested the event(s) to be subscribed/monitored in EPC)

If MTC Provider information is received in the request, the HSS shall check whether the MTC Provider is allowed to perform this operation for the UE; otherwise, the HSS shall skip the MTC provider authorization check.

2a. On success, the HSS 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 some of the requested monitoring configurations fails, the response may include the failedMonitoringConfigs to indicate the failed cause of the failed monitoring configurations.

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, or the MTC Provider is not allowed to perform this operation for the UE, 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.

In the case of redirection, the HSS shall return 3xx status code, which shall contain a Location header with an URI pointing to the endpoint of another HSS (service) instance.

\* \* \* 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 Nhss\_EE service API.

Table 6.4.6.1-1: Nhss\_EE specific Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Clause defined | Description |
| EeSubscription | 6.4.6.2.2 | A subscription to Notifications |
| CreatedEeSubscription | 6.4.6.2.3 |  |
| MonitoringConfiguration | 6.4.6.2.4 | Monitoring Configuration |
| MonitoringReport | 6.4.6.2.5 | Monitoring Report |
| Report | 6.4.6.2.6 |  |
| ReportingOptions | 6.4.6.2.7 |  |
| LocationReportingConfiguration | 6.4.6.2.8 |  |
| ReachabilityForSmsReport | 6.4.6.2.9 |  |
| LossConnectivityConfiguration | 6.4.6.2.10 |  |
| ReachabilityForDataConfiguration | 6.4.6.2.11 |  |
| PduSessionStatusCfg | 6.4.6.2.12 | Reporting configuration for events related to PDN connectivity Status |
| EventType | 6.4.6.3.3 |  |
| LocationAccuracy | 6.4.6.3.4 |  |
| FailedMonitoringConfiguration | 6.4.6.2.xx | Failed Monitoring Configuration in the EE subscription |
| FailedCause | 6.4.6.3.xx | Failed cause of the failed Monitoring Configuration in the EE subscription |

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

Table 6.4.6.1-2: Nhss\_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] |  |
| PatchResult | 3GPP TS 29.571 [7] |  |
| DurationSec | 3GPP TS 29.571 [7] |  |
| DiameterIdentity | 3GPP TS 29.571 [7] |  |
| Dnn | 3GPP TS 29.571 [7] | Data Network Name with Network Identifier only. |
| ProblemDetails | 3GPP TS 29.571 [7] | Response body of error response messages. |
| RedirectResponse | 3GPP TS 29.571 [7] | Response body of redirect response messages. |
| MtcProviderInformation | 3GPP TS 29.571 [7] | MTC Provider Information |
| DiameterIdentity | 3GPP TS 29.571 [7] | Diameter Identify (FQDN) |

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

##### 6.4.6.2.3 Type: CreatedEeSubscription

Table 6.4.6.2.3-1: 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. |
| 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. |
| failedMonitoringConfigs | map(FailedMonitoringConfiguration) | O | 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 FailedMonitoringConfiguration;  see clause 6.4.6.2.xx  This IE is used to indicate the failed subscriptions of event monitoring configuration and the failed cause for them. |

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

##### 6.4.6.2.xx Type: FailedMonitoringConfiguration

Table 6.4.6.2.xx-1: Definition of type FailedMonitoringConfiguration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| eventType | EventType | M | 1 | Contains the Event type, see clause 6.4.6.3.3 |
| failedCause | FailedCause | M | 1 | Contains the failed cause of the subscription of the event monitoring. |

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

##### 6.4.6.3.xx Enumeration: FailedCause

Table 6.4.6.3.xx-1: Enumeration FailedCause

|  |  |
| --- | --- |
| Enumeration value | Description |
| "MTC\_PROVIDER\_NOT\_ALLOWED" | MTC Provider is now allowed to perform monitoring for the requested event type. |
| "MONITORING\_NOT\_ALLOWED" | The subscriber does not have the necessary subscription for monitoring with the requested Event Type. |
| "UNSUPPORTED\_MONITORING\_EVENT\_TYPE" | The required event type is unsupported. |
| "UNSUPPORTED\_MONITORING\_REPORT\_OPTIONS" | The monitoring configuration for the required event type contains unsupported report options. |
| "UNSPECIFIED" | The failed cause is unspecified. |

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

##### 6.4.6.3.2 Simple data types

The simple data types defined in table 6.4.6.3.2-1 shall be supported.

Table 6.4.6.3.2-1: Simple data types

|  |  |  |
| --- | --- | --- |
| Type Name | Type Definition | Description |
| ReferenceId | integer | ReferenceId is used as key in a map of MonitoringConfigurations; see clause 6.4.6.2.4.  ReferenceId is used as key in a map of FailedMonitoringConfiguration; see clause 6.4.6.2.3.  The numeric value should not be higher than 2^64-1 (i.e. it should be possible to convey it in an unsigned 64 integer Information Element, used in other protocols), if interworking with the Event Exposure framework in EPC is required. |
| Imsi | string | IMSI  pattern: '^(imsi-[0-9]{5,15})$' |
| MaxNumOfReports | integer | Maximum number of reports.  Minimum: 1 |

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

## A.5 Nhss\_EE API

openapi: 3.0.0

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

CreatedEeSubscription:

description: It represents the response body of the subscription request, containing data of the created subscription in the HSS

type: object

required:

- eeSubscription

properties:

eeSubscription:

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

eventReports:

type: array

items:

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

minItems: 1

failedMonitoringConfigs:

description: 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 FailedMonitoringConfiguration

type: object

additionalProperties:

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

minProperties: 1

FailedMonitoringConfiguration:

description: Contains the event type and failed cause of the failed Monitoring Configuration in the EE subscription

type: object

required:

- eventType

- failedCause

properties:

eventType:

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

failedCause:

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

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

# ENUMS:

EventType:

description: Type of Monitoring Event

anyOf:

- type: string

enum:

- LOSS\_OF\_CONNECTIVITY

- UE\_REACHABILITY\_FOR\_DATA

- UE\_REACHABILITY\_FOR\_SMS

- LOCATION\_REPORTING

- COMMUNICATION\_FAILURE

- AVAILABILITY\_AFTER\_DDN\_FAILURE

- PDN\_CONNECTIVITY\_STATUS

- type: string

LocationAccuracy:

description: Location accuracy used in the 'Location Reporting' event type

anyOf:

- type: string

enum:

- CELL\_LEVEL

- RAN\_NODE\_LEVEL

- TA\_LEVEL

- type: string

FailedCause:

anyOf:

- type: string

enum:

- MTC\_PROVIDER\_NOT\_ALLOWED

- MONITORING\_NOT\_ALLOWED

- UNSUPPORTED\_MONITORING\_EVENT\_TYPE

- UNSUPPORTED\_MONITORING\_REPORT\_OPTIONS

- UNSPECIFIED

- type: string

description: Indicates the Failed cause of the failed Monitoring Configuration in the EE subscription

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

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