**3GPP TSG-CT WG4 Meeting #96C4-200867**

**E-Meeting, 24th – 28th February 2020**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.572** | **CR** | **0054** | **rev** | **1** | **Current version:** | **16.1.0** |  |
|  | | | | | | | | |
| *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:*** | Request Type and embedded LPP message | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | CT4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_eLCS | | | | |  | ***Date:*** | | | 2020-1-6 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | For 5GC-MO-LR scenarios, AMF invokes the Nlmf\_Location\_DetermineLocation service operation towards the LMF may carry an indication whether a location estimate, or location assistance data is requested and any embedded LPP message in the MO-LR Request (see step 4 in Figure 6.2-1: 5GC-MO-LR Procedure in TS23.273)  Indication whether a location estimate, location assistance data are missing in request message of Nlmf\_Location\_DetermineLocation service operation.  Embedded LPP message is also missing. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1.Add UeLocationServiceInd (Indication whether a location estimate, location assistance data) and lppMessage (embedded LPP message) in Data model InputData which is used as request body of DetermineLocation service operation of Location Service.  2.Define specific content subtype vnd.3gpp.lpp which is used in encoding LTE Positioning Protocol (LPP) IE which is transferred in DetermineLocation service operation of Location Service as binary form.  3.Add new clauses to describe Binary data which will be used inLocation Service. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Stage 2 solution won't be implemented. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2.2.2.2, 6.1.2.2.2, 6.1.2.x(new), 6.1.6.2.2, 6.1.6.3.xx(new), 6.1.6.x(new), 6.1.6.x.1(new), 6.1.6.x.2(new), 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 will introduce backward compatible new features in the OpenAPI specification file of Nlmf\_Location API. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev1:  1. “RequestType” is too generic and may cause misleading, and changed it to “UeLocationServiceInd”, and attribute name “requestType” to “ueLocationServiceInd” | | | | | | | | |

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

##### 5.2.2.2.2 Retrieve UE Location

This procedure allows a consumer NF to request the location information (geodetic location and, optionally, civic location) for a target UE or to activate periodic or triggered deferred location for a target UE.



Figure 5.2.2.2.2-1: DetermineLocation Request

1. The NF Service Consumer shall send an HTTP POST request to the resource URI associated with the "determine-location" custom operation. The input parameters for the request (external client type, LCS correlation identifier, serving cell identifier, location QoS, supported GAD shapes, LDR Type, H-GMLC address, LDR Reference ….) shall be included in the HTTP POST request body.

If UE LCS Capability is received in the request indicating LPP is not supported by the UE, the LMF shall not send LPP messages to the UE in subsequent positioning procedures. If UE LCS Capability is received in the request indicating LPP is supported by the UE, a LPP message from UE may be embedded in the request and in subsequent position procedures.

For 5GC-MO-LR scenarios, the input parameters may include an indication whether a location estimate, or location assistance data.

2a. On success, "200 OK" shall be returned. The response body shall contain the parameters related to the determined position of the UE if any (geodetic position, civic location, positioning methods…).

2b. On failure, one of the HTTP status code listed in Table 6.1.4.2.2-2 shall be returned. For a 4xx/5xx response, the message body should contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.4.2.2-2.

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

##### 6.1.2.2.2 Content type

The following content types shall be supported:

- JSON, as defined in IETF RFC 8259 [13], shall be used as content type of the HTTP bodies specified in the present specification as indicated in clause 5.4 of 3GPP TS 29.500 [4].

- The Problem Details JSON Object (IETF RFC 7807 [15]). The use of the Problem Details JSON object in a HTTP response body shall be signalled by the content type "application/problem+json".

Multipart messages shall also be supported (see clause 6.1.2.x) using the content type "multipart/related", comprising:

- one JSON body part with the "application/json" content type; and

- one or more binary body parts with 3gpp vendor specific content subtypes.

The 3gpp vendor specific content subtypes defined in Table 6.1.2.2.2-1 shall be supported.

Table 6.1.2.2.2-1: 3GPP vendor specific content subtypes

|  |  |
| --- | --- |
| content subtype | Description |
| vnd.3gpp.lpp | Binary encoded payload, encoding LTE Positioning Protocol (LPP) IEs, as specified in 3GPP TS 36.355 [21]. |
| NOTE: Using 3GPP vendor content subtypes allows to describe the nature of the opaque payload (e.g. LPP information) without having to rely on metadata in the JSON payload. | |

See clause 6.1.2.x for the binary payloads supported in the binary body part of multipart messages.

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

#### 6.1.2.x HTTP multipart messages

HTTP multipart messages shall be supported, to transfer opaque LPP Information, in the following service operations (and HTTP messages):

- DetermineLocation Request (POST);

HTTP multipart messages shall include one JSON body part and one or more binary body parts comprising:

- one LPP payload (see clause 6.1.6.x).

The JSON body part shall be the "root" body part of the multipart message. It shall be encoded as the first body part of the multipart message. The "Start" parameter does not need to be included.

The multipart message shall include a "type" parameter (see IETF RFC 2387 [9]) specifying the media type of the root body part, i.e. "application/json".

NOTE: The "root" body part (or "root" object) is the first body part the application processes when receiving a multipart/related message, see IETF RFC 2387 [9]. The default root is the first body within the multipart/related message. The "Start" parameter indicates the root body part, e.g. when this is not the first body part in the message.

For each binary body part in a HTTP multipart message, the binary body part shall include a Content-ID header (see IETF RFC 2045 [10]), and the JSON body part shall include an attribute, defined with the RefToBinaryData type, that contains the value of the Content-ID header field of the referenced binary body part.

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

##### 6.1.6.2.2 Type: InputData

Table 6.1.6.2.2-1: Definition of type InputData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| externalClientType | ExternalClientType | O | 0..1 |  |
| correlationID | CorrelationID | O | 0..1 |  |
| amfId | NfInstanceId | O | 0..1 | Indicates the AMF Instance serving the UE. LMF shall use the AMF Instance to forward LCS related N1/N2 messages to the UE/RAN. |
| locationQoS | LocationQoS | O | 0..1 |  |
| supportedGADShapes | array(SupportedGADShapes) | O | 1..N |  |
| supi | Supi | O | 0..1 |  |
| pei | Pei | O | 0..1 |  |
| gpsi | Gpsi | O | 0..1 |  |
| ecgi | Ecgi | O | 0..1 | When present, this IE shall indicate the identifier of the E-UTRAN cell serving the UE. (NOTE 2) |
| ncgi | Ncgi | O | 0..1 | When present, this IE shall indicate the identifier of the NR cell serving the UE. (NOTE 2) |
| priority | LcsPriority | O | 0..1 |  |
| velocityRequested | VelocityRequested | O | 0..1 |  |
| ueLcsCap | UeLcsCapability | O | 0..1 | When present, this IE shall indicate the LCS capability supported by the UE. |
| lcsServiceType | LcsServiceType | O | 0..1 | The LCS service type |
| ldrType | LdrType | O | 0..1 | The type of LDR |
| hgmlcCallBackURI | Uri | O | 0..1 | Callback URI of the H-GMLC |
| ldrReference | LdrReference | O | 0..1 | LDR Reference Number |
| periodicEventInfo | PeriodicEventInfo | C | 0..1 | Information for periodic event reporting |
| areaEventInfo | AreaEventInfo | C | 0..1 | Information for area event reporting |
| motionEventInfo | MotionEventInfo | C | 0..1 | Information for motion event reporting |
| reportingAccessTypes | ReportingAccessTypes | O | 0..1 | Allowed access types for event reporting |
| ueLocationServiceInd | UeLocationServiceInd | C | 0..1 | If UE indicates the type of the request in MO-LR Request, this IE shall be present and indicate the type of request for a 5GC-MO-LR. |
| lppMessage | RefToBinaryData | C | 0..1 | If UE includes the LPP message in MO-LR Request, this IE shall be present and Indicate the binary data of LPP message. |
| NOTE 1: At least one of the attributes defined in this table shall be present in the InputData structure.  NOTE 2: Attribute "ecgi" and "ncgi" shall not be present at the same time. | | | | |

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

##### 6.1.6.3.xx Enumeration: UeLocationServiceInd

Table 6.1.6.3.xx-1: Enumeration UeLocationServiceInd

|  |  |
| --- | --- |
| Enumeration value | Description |
| "LOCATION\_ESTIMATE" | Request location estimate |
| "LOCATION\_ASSISTANCE\_DATA" | Request location assistance data |

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

#### 6.1.6.x Binary data

##### 6.1.6.x.1 Introduction

This clause defines the binary data that shall be supported in a binary body part in an HTTP multipart message (see clauses 6.1.2.2.2 and 6.1.2.x).

##### 6.1.6.x.2 LPP Message

LPP Message shall encode a LPP message as specified in 3GPP TS 36.355 [21], using the vnd.3gpp.lpp content-type.

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

## A.2 Nlmf\_Location API

openapi: 3.0.0

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

paths:

/determine-location:

post:

summary: Determine Location of an UE

operationId: DetermineLocation

tags:

- Determine Location

requestBody:

content:

application/json:

schema:

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

multipart/related: # message with binary body part(s)

schema:

type: object

properties: # Request parts

jsonData:

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

binaryDataLppMessage:

type: string

format: binary

encoding:

jsonData:

contentType: application/json

binaryDataLppMessage:

contentType: application/vnd.3gpp.lpp

headers:

Content-Id:

schema:

type: string

required: true

responses:

'200':

description: Expected response to a valid request

content:

application/json:

schema:

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

'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'

'504':

$ref: 'TS29571\_CommonData.yaml#/components/responses/504'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

callbacks:

EventNotify:

'{$request.body#/hgmlcCallBackURI}':

post:

requestBody:

description: UE Event Notification

content:

application/json:

schema:

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

responses:

'204':

description: Expected response to a valid notification

'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'

'504':

$ref: 'TS29571\_CommonData.yaml#/components/responses/504'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

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

#

# COMPLEX TYPES

#

InputData:

type: object

not:

required: [ ecgi, ncgi ]

properties:

externalClientType:

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

correlationID:

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

amfId:

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

locationQoS:

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

supportedGADShapes:

type: array

items:

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

minItems: 1

supi:

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

pei:

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

gpsi:

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

ecgi:

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

ncgi:

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

priority:

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

velocityRequested:

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

ueLcsCap:

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

lcsServiceType:

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

ldrType:

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

hgmlcCallBackURI:

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

ldrReference:

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

periodicEventInfo:

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

areaEventInfo:

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

motionEventInfo:

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

reportingAccessTypes:

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

ueLocationServiceInd:

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

lppMessage:

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

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

ReportedEventType:

anyOf:

- type: string

enum:

- PERIODIC\_EVENT

- ENTERING\_AREA\_EVENT

- LEAVING\_AREA\_EVENT

- BEING\_INSIDE\_AREA\_EVENT

- MOTION\_EVENT

- MAXIMUM\_INTERVAL\_EXPIRATION\_EVENT

- LOCATION\_CANCELLATION\_EVENT

- type: string

TerminationCause:

anyOf:

- type: string

enum:

- TERMINATION\_BY\_UE

- TERMINATION\_BY\_NETWORK

- NORMAL\_TERMINATION

- type: string

LcsQosClass:

anyOf:

- type: string

enum:

- BEST\_EFFORT

- ASSURED

- type: string

UeLocationServiceInd:

anyOf:

- type: string

enum:

- LOCATION\_ESTIMATE

- LOCATION\_ASSISTANCE\_DATA

- type: string

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

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