**3GPP TSG-CT WG4 Meeting #101eC4-205085**

**E-Meeting, 03rd – 13th November 2020 *was* C4-205085**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.572** | **CR** | **0081** | **rev** | **1** | **Current version:** | **16.4.0** |  |
|  | | | | | | | | |
| *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:*** | Indication of control plane CIoT 5GS optimization in LocationContextTransfer | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | CT4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_eLCS | | | | |  | ***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:*** | | 1.For support of Event Reporting with change of LMF during Low Power Periodic and Triggered 5GC-MT-LR Procedure (see clause 6.7.2 of TS 23.273), if Namf\_Communication\_N1MessageNotify service operation from AMF to old LMF includes an indication of Control Plane CIoT 5GS Optimisation, old LMF needs to deliver this indication of Control Plane CIoT 5GS Optimisation, and also the serving cell ID to new LMF in Nlmf\_Location\_LocationContextTransfer Request, see the hilghlighted part below.  *2. Steps 3-8 for the LMF Change procedure in clause 6.4 are performed with the following exceptions.*  *- At step 4, the Namf\_Communication\_N1MessageNotify service operation includes an indication of Control Plane CIoT 5GS Optimisation.*  *- At step 6, the Nlmf\_Location\_LocationContextTransfer Request service operation includes an indication of Control Plane CIoT 5GS Optimisation and the serving cell ID.*  2. The new LMF need to send Event Report Acknowledgemnt to UE via Namf\_Communication\_N1N2MessageTransfer service operation of AMF, lcsCorrelationId may be included in Namf\_Communication\_N1N2MessageTransfer request and that can assist AMF in identifying the related location session (allocated by AMF in DetermineLocation service operation), therefore old LMF should transfer lcsCorrelationId to new LMF if it is available.  3. GUAMI is included in Namf\_Communication\_N1MessageNotify from AMF to LMF, and LMF can use GUAMI to from which AMF the N1/N2 message is notified (if implicit subscription of N1MessageNotify is done and the subscriptionId does not exists), the old LMF need to transfer received GUAMI to new LMF too and let new LMF know from which AMF the N1/N2 message is notified, and new LMF send Namf\_Communication\_N1MessageNotify with Event Report Ack message to the right AMF | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Included the indication of Control Plane CIoT 5GS Optimisation, the serving cell ID, LCS Correlation Id, GUAMI in the Transfer Location Context request service operation of Location service.   1. Add text related to the indication of Control Plane CIoT 5GS Optimisation in clause 5.2.2.5.2. 2. Corrected the figure Figure 5.2.2.5.2-1 in clause 5.2.2.5.2. 3. Added lcsCorrelationId, cIoT5GSOptimisation, ecgi, ncgi, guami attributes in data model LocContextData | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Clause 6.7.2 Event Reporting with change of LMF of TS 23.273 (of Low Power Periodic and Triggered 5GC-MT-LR Procedures) won't be fully supported. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2.2.5.2, 6.1.6.1, 6.1.6.2.30, 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 corrections in the OpenAPI specification file of TS29572\_Nlmf\_Location OpenAPI. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev1:   1. change the P column of serving Cells (i.e. ecgi, ncgi) from optional to conditional. 2. removed the lcsCorrelationId Table 6.1.6.2.30-1 and from A.2. | | | | | | | | |

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

##### 5.2.2.5.2 Transfer Location Context

This procedure allows a NF service consumer (e.g. the old LMF) to transfer location context information for periodic or triggered location for a target UE (see clause 6.4 and clause 6.7.2 of 3GPP TS 23.273 [19]). The NF service consumer discovers the service URI of the new LMF by performing a discovery via NRF using:

- the identification of the LMF received (from an AMF) during an earlier Namf\_Communication\_N1MessageNotify service operation to the consumer NF;

otherwise (if not available),

- the identification of an LMF locally provisioned in the consumer NF.



Figure 5.2.2.5.2-1: LocationContextTransfer Request

1. The NF Service Consumer shall send an HTTP POST request to the Custom operation URI ("/location-context-transfer") on the Service URI discovered as described above. The request body shall include an AMF identity, Deferred location type, Deferred location parameters, Notification Target Address (H-GMLC callback URI), Notification Correlation ID (LDR reference), an embedded event report message and may include an event reporting status and UE location information, and shall include an indication of Control Plane CIoT 5GS Optimisation if N1 message is received from the UE with Control Plane CIoT 5GS Optimisation.

2a. On success, "204 No content" shall be returned by the LMF.

2b. On failure, one of the HTTP status codes listed in Table 6.1.4.4.2-2 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 6.1.4.4.2-2.

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

#### 6.1.6.1 General

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

Table 6.1.6.1-1 specifies the data types defined for the Nlmf\_Location service based interface protocol.

Table 6.1.6.1-1: Nlmf\_Location specific Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Clause defined | Description |
| InputData | 6.1.6.2.2 | Information within Determine Location Request |
| LocationData | 6.1.6.2.3 | Information within Determine Location Response |
| GeographicalCoordinates | 6.1.6.2.4 | Geographical coordinates |
| GeographicArea | 6.1.6.2.5 | Geographic area specified by different shape |
| Point | 6.1.6.2.6 | Ellipsoid Point |
| PointUncertaintyCircle | 6.1.6.2.7 | Ellipsoid point with uncertainty circle |
| PointUncertaintyEllipse | 6.1.6.2.8 | Ellipsoid point with uncertainty ellipse |
| Polygon | 6.1.6.2.9 | Polygon |
| PointAltitude | 6.1.6.2.10 | Ellipsoid point with altitude |
| PointAltitudeUncertainty | 6.1.6.2.11 | Ellipsoid point with altitude and uncertainty ellipsoid |
| EllipsoidArc | 6.1.6.2.12 | Ellipsoid Arc |
| LocationQoS | 6.1.6.2.13 | QoS of Location request |
| CivicAddress | 6.1.6.2.14 | Indicates a Civic address |
| PositioningMethodAndUsage | 6.1.6.2.15 | Indicates the usage of a positioning method |
| GnssPositioningMethodAndUsage | 6.1.6.2.16 | Indicates the usage of a Global Navigation Satellite System (GNSS) positioning method |
| VelocityEstimate | 6.1.6.2.17 | Velocity estimate |
| HorizontalVelocity | 6.1.6.2.18 | Horizontal velocity |
| HorizontalWithVerticalVelocity | 6.1.6.2.19 | Horizontal and vertical velocity |
| HorizontalVelocityWithUncertainty | 6.1.6.2.20 | Horizontal velocity with speed uncertainty |
| HorizontalWithVerticalVelocityAndUncertainty | 6.1.6.2.21 | Horizontal and vertical velocity with speed uncertainty |
| UncertaintyEllipse | 6.1.6.2.22 | Ellipse with uncertainty |
| UeLcsCapability | 6.1.6.2.23 | Indicates the LCS capability supported by the UE. |
| PeriodicEventInfo | 6.1.6.2.24 | Indicates the information of periodic event reporting |
| AreaEventInfo | 6.1.6.2.25 | Indicates the information of area based event reporting |
| ReportingArea | 6.1.6.2.26 | Indicates an area for event reporting |
| MotionEventInfo | 6.1.6.2.27 | Indicates the information of motion based event reporting |
| ReportingAccessTypes | 6.1.6.2.28 | Indicates access types of event reporting |
| CancelLocData | 6.1.6.2.29 | Information within Cancel Location Request |
| LocContextData | 6.1.6.2.30 | Information within Transfer Location Context Request |
| EventReportMessage | 6.1.6.2.31 | Indicates an event report message |
| EventReportingStatus | 6.1.6.2.32 | Indicates the status of event reporting |
| UELocationInfo | 6.1.6.2.33 | Indicates location information of a UE |
| EventNotifyData | 6.1.6.2.34 | Information within Event Notify Request |
| UeConnectivityState | 6.1.6.2.35 | Indicates the connectivity state of a UE |
| Altitude | 6.1.6.3.2 | Indicates value of altitude |
| Angle | 6.1.6.3.2 | Indicates value of angle |
| Uncertainty | 6.1.6.3.2 | Indicates value of uncertainty |
| Orientation | 6.1.6.3.2 | Indicates value of orientation angle |
| Confidence | 6.1.6.3.2 | Indicates value of confidence |
| Accuracy | 6.1.6.3.2 | Indicates value of accuracy |
| InnerRadius | 6.1.6.3.2 | Indicates value of the inner radius |
| CorrelationID | 6.1.6.3.2 | LCS Correlation ID |
| AgeOfLocationEstimate | 6.1.6.3.2 | Indicates value of the age of the location estimate |
| HorizontalSpeed | 6.1.6.3.2 | Indicates value of horizontal speed |
| VerticalSpeed | 6.1.6.3.2 | Indicates value of vertical speed |
| SpeedUncertainty | 6.1.6.3.2 | Indicates value of speed uncertainty |
| BarometricPressure | 6.1.6.3.2 | Specifies the measured uncompensated atmospheric pressure |
| LcsServiceType | 6.1.6.3.2 | LCS service type |
| LdrReference | 6.1.6.3.2 | LDR Reference |
| ReportingAmount | 6.1.6.3.2 | Number of required periodic event reports |
| ReportingInterval | 6.1.6.3.2 | Event reporting periodic interval |
| MinimumInterval | 6.1.6.3.2 | Minimum interval between event reports |
| MaximumInterval | 6.1.6.3.2 | Maximum interval between event reports |
| SamplingInterval | 6.1.6.3.2 | Maximum time interval between consecutive evaluations by a UE of a trigger event |
| ReportingDuration | 6.1.6.3.2 | Maximum duration of event reporting |
| LinearDistance | 6.1.6.3.2 | Minimum straight line distance moved by a UE to trigger a motion event report |
| LMFIdentification | 6.1.6.3.2 | LMF identification |
| EventReportCounter | 6.1.6.3.2 | Number of event reports received from the target UE |
| EventReportDuration | 6.1.6.3.2 | Duration of event reporting |
| ExternalClientType | 6.1.6.3.3 | Indicates types of External Clients |
| SupportedGADShapes | 6.1.6.3.4 | Indicates supported GAD shapes |
| ResponseTime | 6.1.6.3.5 | Indicates acceptable delay of location request |
| PositioningMethod | 6.1.6.3.6 | Indicates supported positioning methods |
| PositioningMode | 6.1.6.3.7 | Indicates supported modes used for positioning method |
| GnssId | 6.1.6.3.8 | Global Navigation Satellite System (GNSS) ID |
| Usage | 6.1.6.3.9 | Indicates usage made of the location measurement |
| LcsPriority | 6.1.6.3.10 | Indicates priority of the LCS client |
| VelocityRequested | 6.1.6.3.11 | Indicates velocity requirement |
| AccuracyFulfilmentIndicator | 6.1.6.3.12 | Indicates fulfilment of requested accuracy |
| VerticalDirection | 6.1.6.3.13 | Indicates direction of vertical speed |
| LdrType | 6.1.6.3.14 | Indicates LDR types |
| ReportingAreaType | 6.1.6.3.15 | Indicates type of event reporting area |
| OccurrenceInfo | 6.1.6.3.16 | Specifies occurrence of event reporting |
| ReportingAccessType | 6.1.6.3.17 | Specifies access types of event reporting |
| EventClass | 6.1.6.3.18 | Specifies event classes |
| ReportedEventType | 6.1.6.3.19 | Specifies type of event reporting |
| TerminationCause | 6.1.6.3.20 | Specifies causes of event reporting termination |
| LcsQosClass | 6.1.6.3.21 | Specifies LCS QoS class |
| UeLocationServiceInd | 6.1.6.3.22 | Specifies location service types requested by UE |

Table 6.1.6.1-2 specifies data types re-used by the Nlmf\_Location 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 Nlmf service based interface.

Table 6.1.6.1-2: Nlmf\_Location re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| Supi | 3GPP TS 29.571 [8] | Subscription Permanent Identifier |
| Pei | 3GPP TS 29.571 [8] | Permanent Equipment Identifier |
| Gpsi | 3GPP TS 29.571 [8] | Generic Public Subscription Identifier |
| Ecgi | 3GPP TS 29.571 [8] | E-UTRA Cell Identity |
| Ncgi | 3GPP TS 29.571 [8] | NR Cell Identity |
| NfInstanceId | 3GPP TS 29.571 [8] | Network Function Instance ID |
| Uri | 3GPP TS 29.571 [8] | Uniform Resource Identifier |
| RefToBinaryData | 3GPP TS 29.571 [8] | Reference to binary data |
| AccessType | 3GPP TS 29.571 [8] | Access type |
| CmState | 3GPP TS 29.518 [23] | Connection Management State |
| Guami | 3GPP TS 29.571 [8] | GUAMI |

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

##### 6.1.6.2.30 Type: LocContextData

Table 6.1.6.2.30-1: Definition of type LocContextData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| amfId | NfInstanceId | M | 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 | C | 0..1 | This IE shall contain the location QoS if available. |
| supportedGADShapes | array(SupportedGADShapes) | C | 0..N | This IE shall contain the supported GAD shapes if available. |
| Supi | Supi | C | 0..1 | This IE shall contain the SUPI if available. |
| Gpsi | Gpsi | C | 0..1 | This IE shall contain the GPSI if available. |
| ldrType | LdrType | M | 1 | The type of LDR |
| hgmlcCallBackURI | Uri | M | 1 | Callback URI of the H-GMLC |
| ldrReference | LdrReference | M | 1 | LDR Reference |
| 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 |
| eventReportMessage | EventReportMessage | M | 1 | Contains an embedded event report |
| eventReportingStatus | EventReportingStatus | O | 0..1 | Status of event reporting |
| ueLocationInfo | UELocationInfo | O | 0..1 | Location information for the target UE |
| cIoT5GSOptimisation | boolean | C | 0..1 | This IE shall be present if it was received from AMF. When present, it shall be set as follows:  - true: Control Plane CIoT 5GS Optimisation was used and no signalling or data is currently pending for the UE at the AMF.  - false (default): Control Plane CIoT 5GS Optimisation was not used or signalling or data is currently pending for the UE at the AMF. |
| ecgi | Ecgi | C | 0..1 | When present, this IE shall indicate the identifier of the E-UTRAN cell serving the UE.  This IE shall be present if it was received from AMF. |
| ncgi | Ncgi | C | 0..1 | When present, this IE shall indicate the identifier of the NR cell serving the UE.  This IE shall be present if it was received from AMF |
| guami | Guami | C | 0..1 | This IE shall be present if it was received from AMF.  When present, it shall contain the GUAMI serving the UE. |
| NOTE: At least one of periodicEventInfo, areaEventInfo or motionEventInfo shall be present in the LocContextData structure. | | | | |

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

## A.2 Nlmf\_Location API

openapi: 3.0.0

info:

version: '1.1.1'

title: 'LMF Location'

description: |

LMF Location Service.

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

LocContextData:

type: object

required:

- amfId

- ldrType

- hgmlcCallBackURI

- ldrReference

- eventReportMessage

properties:

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'

gpsi:

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

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'

eventReportMessage:

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

eventReportingStatus:

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

ueLocationInfo:

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

cIoT5GSOptimisation:

type: boolean

default: false

ecgi:

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

ncgi:

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

guami:

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

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

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