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Stage 3
(3GPP TS 29.515 version 19.5.0 Release 19)**



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Foreword

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In the present document, modal verbs have the following meanings:

- shall** indicates a mandatory requirement to do something
- shall not** indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

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- may** indicates permission to do something
- need not** indicates permission not to do something

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- can** indicates that something is possible
- cannot** indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

- will** indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- will not** indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- might** indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

1 Scope

The present document specifies the stage 3 protocol and data model for the Ngmlc Service Based Interface. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the GMLCc.

The 5G System stage 2 architecture and procedures are specified in 3GPP TS 23.501 [2] and 3GPP TS 23.502 [3].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition are specified in 3GPP TS 29.500 [5] and 3GPP TS 29.501 [6].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".
- [3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".
- [4] 3GPP TS 23.273: "5G System Location Services (LCS)".
- [5] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".
- [6] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".
- [7] OpenAPI Initiative, "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.
- [8] IETF RFC 9113: "HTTP/2".
- [9] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".
- [10] IETF RFC 9457: "Problem Details for HTTP APIs".
- [11] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".
- [12] 3GPP TS 29.572: "5G System; Location Management Services; Stage 3".
- [13] ITU Recommendation E.164: "The international public telecommunication numbering plan".
- [14] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".
- [15] 3GPP TS 33.501: "Security architecture and procedures for 5G system".
- [16] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".
- [17] 3GPP TS 29.510: "Network Function Repository Services; Stage 3".
- [18] 3GPP TS 22.071: "Location Services (LCS); Service description; Stage 1".
- [19] 3GPP TR 21.900: "Technical Specification Group working methods".
- [20] 3GPP TS 29.518: "5G System; Access and Mobility Management Services; Stage 3".
- [21] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

- [22] 3GPP TS 33.256: "Security aspects of Uncrewed Aerial Systems (UAS)".
- [23] 3GPP TS 37.355: "Technical Specification Group Radio Access Network; LTE Positioning Protocol (LPP)".
- [24] 3GPP TS 29.122: "T8 reference point for Northbound APIs".
- [25] void
- [26] 3GPP TS 38.305: "NG Radio Access Network (NG-RAN); Stage 2 functional specification of User Equipment (UE) positioning in NG-RAN"

3 Definitions of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

3.2 Symbols

Void

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

| | |
|-------|---|
| 5GC | 5G Core Network |
| AMF | Access and Mobility Management Function |
| GAD | Geographical Area Description |
| GMLC | Gateway Mobile Location Centre |
| GPSI | Generic Public Subscription Identifier |
| LCS | Location Services |
| LDR | Location Deferred Request |
| LPHAP | Low Power and High Accuracy Positioning |
| MBSR | Mobile Base Station Relay |
| MO-LR | Mobile Originated Location Request |
| MT-LR | Mobile Terminated Location Request |
| MWAB | Mobile gNB with Wireless Access Backhauling |
| NEF | Network Exposure Function |
| NI-LR | Network Induced Location Request |
| NRF | Network Repository Function |
| SUPI | Subscription Permanent Identifier |

4 Overview

The Gateway Mobile Location Centre (GMLC) is the network entity in the 5G Core Network (5GC) supporting Location Services (LCS). Within the 5GC, the GMLC offers services to the AMF, GMLC, NEF, NWDAF and LMF via the Ngmlc service based interface (see 3GPP TS 23.501 [2], 3GPP TS 23.502 [3] and 3GPP TS 23.273 [4]).

Figure 4-1 provides the reference model (in service based interface representation and in reference point representation), with focus on the GMLC:

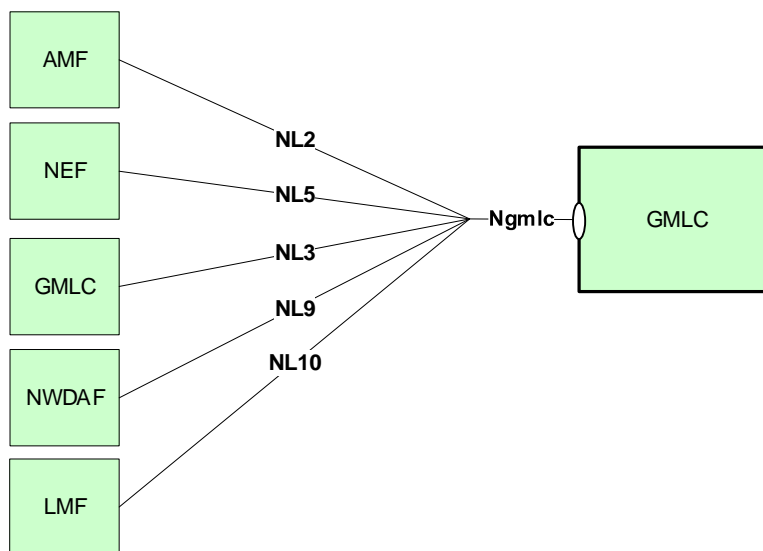


Figure 4-1: Reference model – GMLC

The functionalities supported by the GMLC are listed in clause 4.3.3 of 3GPP TS 23.273 [4].

5 Services offered by the GMLC

5.1 Introduction

The table 5.1-1 shows the GMLC Services and GMLC Service Operations:

Table 5.1-1: List of GMLC Services

| Service Name | Service Operations | Operation Semantics | Example Consumer(s) |
|----------------|-----------------------|---------------------|----------------------------|
| Ngmlc_Location | ProvideLocation | Request/Response | GMLC, NEF, NWDAF, LMF, AMF |
| | LocationUpdate | Request/Response | AMF, V-GMLC |
| | LocationUpdateNotify | Notify | NEF |
| | CancelLocation | Request/Response | H-GMLC, NEF, NWDAF |
| | EventNotify | Notify | H-GMLC, NEF, NWDAF |
| | PrivacyCheckIdMapping | Request/Response | H-GMLC |

Table 5.1-2 summarizes the corresponding APIs defined for this specification.

Table 5.1-2: API Descriptions

| Service Name | Clause | Description | OpenAPI Specification File | apiName | Annex |
|----------------|--------|------------------------|-----------------------------|-----------|-------|
| Ngmlc_Location | 6.1 | Ngmlc Location Service | TS29515_Ngmlc_Location.yaml | ngmlc-loc | A.2 |

5.2 Ngmlc_Location Service

5.2.1 Service Description

The Ngmlc_Location service enables an NF to request location determination (current geodetic and optionally local and/or civic location) for a target UE or to request relative locations, distance, or direction between UEs. The following are the key functionalities of this NF service.

- Allow the consumer NF to request the current geodetic and optionally local and/or civic location of a target UE.
- Allow the consumer NF to subscribe/unsubscribe the geodetic and optionally local and/or civic location of a target UE for some certain events.
- Allow the consumer NF to cancel an on-going periodic or triggered location request of a target UE.
- Allow the consumer NF to get notified about the geodetic and optionally local and/or civic location of a target UE when some certain events are detected.
- Allow the consumer NF to perform privacy check and ID mapping of a UE for Ranging SL Positioning service.
- Allow the consumer NF to request the relative locations, distance, or direction between UEs.

5.2.2 Service Operations

5.2.2.1 Introduction

The service operations defined for the Ngmlc_Location services are as follows:

- ProvideLocation
- LocationUpdate
- CancelLocation
- EventNotify
- LocationUpdateNotify
- LocationUpdateSubscribe
- PrivacyCheckIdMapping

5.2.2.2 ProvideLocation

5.2.2.2.1 General

The following procedures are supported using the "ProvideLocation" service operation:

- Provide location of a single UE
- Provide locations of a group of UEs
- Provide locations of a single UE relative to one or more related UEs

5.2.2.2.2 Provide Location of a single UE

The service operation is used during the procedures:

- 5GC-MT-LR Procedures for the commercial location service (see 3GPP TS 23.273 [4], clause 6.1.2, 6.1.4, and 6.1.5)

- Initiation and Reporting of Location Events (see 3GPP TS 23.273 [4], clause 6.3.1, clause 6.16.1)
- Unified Location Service Exposure Procedure without routing by a UDM (see 3GPP TS 23.273 [4], clause 6.5.1)
- Procedures with interaction between 5GC and EPC (see 3GPP TS 23.273 [4], clause 6.13)
- Procedures of SL-MT-LR involving LMF (see 3GPP TS 23.273 [4], clause 6.20.3)
- Procedures of SL-MT-LR for periodic, triggered Location Events (see 3GPP TS 23.273 [4], clause 6.20.4)
- 5GC-MT-LR Procedure using SL positioning (see 3GPP TS 23.273 [4], clause 6.20.5)

The ProvideLocation service operation is invoked by a NF Service Consumer, e.g. a NEF, GMLC, NWDAF or LMF, towards the GMLC to request to provide the location information (geodetic location and, optionally local and/or civic location) for a target UE or to subscribe to periodic or triggered deferred location for a target UE. See Figure 5.2.2.2-1.

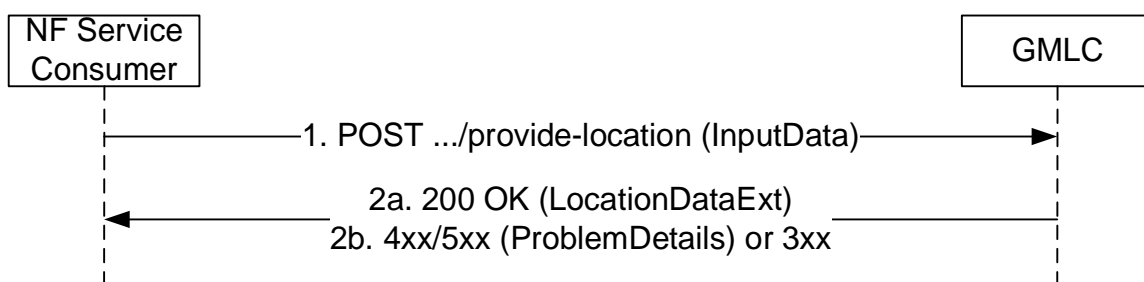


Figure 5.2.2.2-1: ProvideLocation Request/Response for a target UE

1. The NF Service Consumer shall send an HTTP POST request to the URI associated with the "provide-location" custom operation. The input parameters for the request (the target UE identification (SUPI, GPSI or Application Layer ID), required QoS, supported GAD shapes, LCS client type, external Service Identity, Codeword, service coverage, LDR type, serving AMF address, LDR reference, scheduled location time, LMF ID, LpHapType, Event Report Expected Area, reporting indication, integrity requirements, LOS/NLOS measurement indication, requested ranging_SL location results, related UEs, ...) may be included in the HTTP POST request body, H-GMLC Callback URI may be included in the HTTP POST request body to V-GMLC (eventually to AMF) for implicit subscription of EventNotify provided by GMLC, and NEF or NWDAF Callback URI may be included in the HTTP POST request body to GMLC/H-GMLC for implicit subscription of EventNotify provided by GMLC/H-GMLC.

If the request is to use a location reporting via user plane, an indication of the request of location reporting via user plane shall be included in the HTTP POST contents. If the indication of the request of location reporting via user plane is included in the HTTP POST contents, the endpoint address of the user plane for location reporting may be included in the HTTP POST contents. The criteria for sending cumulative event reports over control plane may be included in the contents when the request is sent from H-GMLC to V-GMLC.

If Multiple Location QoS was requested, the H-GMLC as NF service consumer may perform the Location QoS mapping to obtain the location QoS that can be applicable to EPS based on the original multiple QoS (see clause 6.19 of 3GPP TS 23.273 [4]) and may include the mapped Location QoS applicable to EPS in the request to the V-GMLC as NF service producer.

If the MBSR indication is received, the (H-)GMLC of the MBSR UE shall skip the privacy check based on the MBSR indication and/or the subscription data from UDM.

If the MWAB indication is received, the (H-)GMLC of the MWAB UE shall skip the privacy check based on the MWAB indication. If the MWAB indication was received from the LMF, the GMLC in MWAB-UE Broadcasted PLMN shall relay the MWAB indication to the GMLC in MWAB-UE HPLMN.

- 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, local position, civic location, positioning methods, integrity result,...).

If geographic area(s) are received in the request for area event, the GMLC (or V-GMLC when roaming) shall convert the received geographic area(s) into a corresponding list of cell and/or tracking area identities when invoking AMF location services.

- 2b On failure or redirection, one of the HTTP status code listed in Table 6.1.3.2.2-2 may be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.3.2.2-2.

5.2.2.2.3 Provide Locations of a group of UEs

The service operation is used during the procedures:

- Bulk Operation of LCS Service Request Targeting to Multiple UEs (see 3GPP TS 23.273 [4], clause 6.8)

The ProvideLocation service operation is invoked by a NF Service Consumer, e.g. a NEF or NWDAF, towards the GMLC (e.g. (H)GMLC when roaming) to request to provide the location information (geodetic location and, optionally local and/or civic location) for a target group of UEs or to subscribe to periodic or triggered deferred location for a target group of UEs. See Figure 5.2.2.2.3-1.

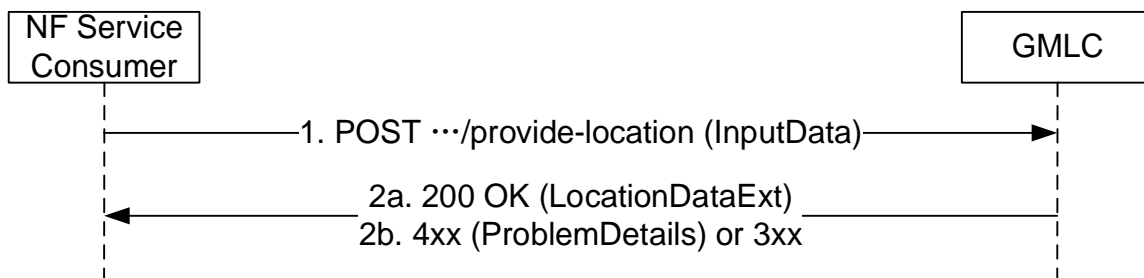


Figure 5.2.2.2.3-1: ProvideLocation Request/Response for a target group

1. The NF Service Consumer shall send an HTTP POST request to the URI associated with the "provide-location" custom operation. The input parameters the target group identification (the External Group ID or the Internal Group ID), LCS client type, eventNotificationUri shall be included in the HTTP POST request body, LDR type, LDR reference shall be also included in the request if requesting the deferred LCS service, the required QoS, supported GAD shapes, external Service Identity, service coverage should be included in the request. If the request is related to location determination at the scheduled time, the scheduled location time shall be included in the HTTP POST request body.

If the request is to use a location reporting via user plane, an indication of the request of location reporting via user plane shall be included in the HTTP POST contents. If the indication of the request of location reporting via user plane is included in the HTTP POST contents, the endpoint address of the user plane for location reporting may be included in the HTTP POST contents. The criteria for sending cumulative event reports over control plane may be included in the contents when the request is sent from H-GMLC to V-GMLC.

GMLC shall translate the target group identification into the list of the UE identifications which belong to the target group by invoking the related service provided by UDM, then for each UE in the list, GMLC initiates following steps of procedures of the 5GC-MT-LR or Deferred 5GC-MT-LR as defined in 3GPP TS 23.273 [4] clause 6.8.

If geographic area(s) are received in the request for area event, the GMLC (or V-GMLC when roaming) shall convert the received geographic area(s) into a corresponding list of cell and/or tracking area identities when invoking AMF location services.

- 2a. On success, "200 OK" shall be returned. The response body shall contain the success type.
- 2b On failure or redirection, one of the HTTP status code listed in Table 6.1.3.2.2-2 may be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.3.2.2-2.

5.2.2.3 LocationUpdate

5.2.2.3.1 General

The service operation is used during the procedure:

- 5GC-MO-LR Procedure (see 3GPP TS 23.273 [4], clause 6.2)

The LocationUpdate enables the NF consumer (e.g. AMF) to update UE location information towards the GMLC. See Figure 5.2.2.3.1-1.

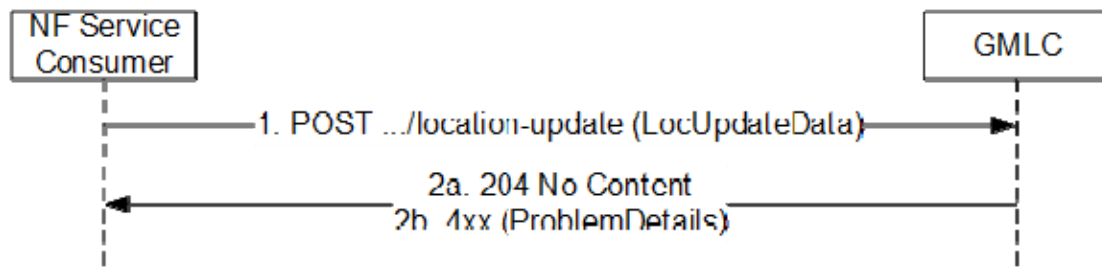


Figure 5.2.2.3.1-1: LocationUpdate Request/Response

1. The NF Service Consumer shall send an HTTP POST request to the URI associated with the "location-update" custom operation. The request body shall contain a LocUpdateData object.
- 2a. On success, "204 No content" shall be returned by the GMLC.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.4.2-2 may be returned. For a 4xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.3.4.2-2.

5.2.2.4 CancelLocation

5.2.2.4.1 General

The service operation is used during the procedure:

- Cancellation of Reporting of Location Events by an AF, an NF or External LCS Client or GMLC (see 3GPP TS 23.273 [4], clause 6.3.3)

The CancelLocation enables the consumer NF to use the service operation to cancel a deferred 5GC-MT-LR procedure for periodic or triggered location for a single UE or for a group. See Figure 5.2.2.4.1-1.

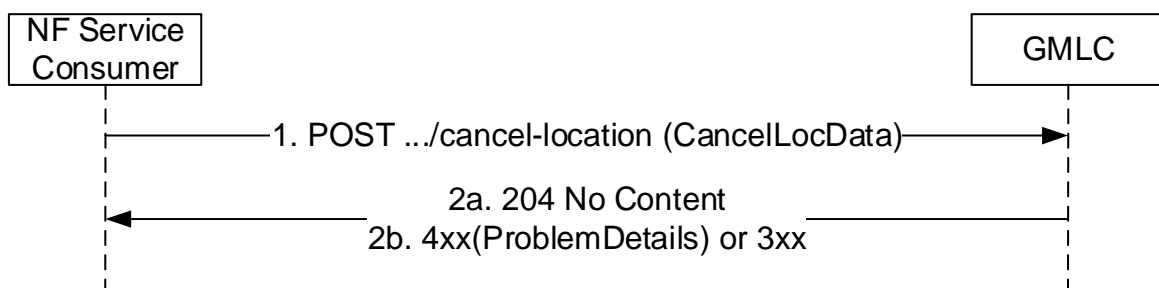


Figure 5.2.2.4.1-1: CancelLocation Request/Response

1. The NF Service Consumer shall send an HTTP POST request to the URI associated with the "cancel-location" custom operation. The input parameters for the request ((H-)GMLC contact address, LDR reference number, LMF identification, serving AMF address) should be included in the HTTP POST request body.

If the request is sent from the (H)GMLC to the (V)GMLC, the (H)GMLC shall include the nrppaPeriodicInd IE with the value true if previously received in an Event Notification (see clause 5.2.2.5.2).

2a. On success, "204 No Content" shall be returned.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.3.2-2 may be returned. For a 4xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.3.3.2-2.

5.2.2.5 EventNotify

5.2.2.5.1 General

The following procedures are supported using the "EventNotify" service operation:

- EventNotify for a single UE
- EventNotify for the UEs in a target group
- EventNotify for a single UE relative to one or more related UEs

5.2.2.5.2 EventNotify for a single UE

The service operation is used during the procedure:

- Deferred 5GC-MT-LR Procedure for Periodic, Triggered and UE Available Location Events (see 3GPP TS 23.273 [4], clause 6.3)
- Unified Location Service Exposure Procedure without routing by a UDM (see 3GPP TS 23.273 [4], clause 6.5.1)
- Procedures of SL-MT-LR for periodic, triggered Location Events (see 3GPP TS 23.273 [4], clause 6.20.4)

The EventNotify for a single UE enables the consumer NF (e.g. (H)GMLC, NEF, NWDAF) to get notified about the geodetic and optionally local and/or civic location, the completion or activation of deferred location, mobility to a different AMF/MME of a UE with deferred location for a target UE, the active state of the location reporting over user plane, or the statistics on the location reporting over user plane, when some certain events are detected. See Figure 5.2.2.5.2-1.

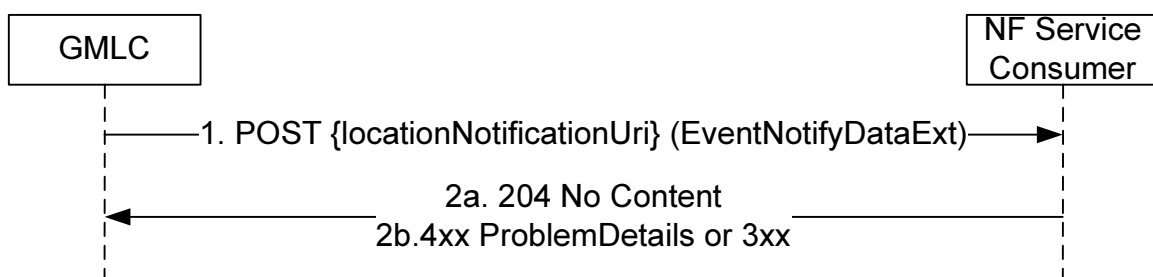


Figure 5.2.2.5.2-1: EventNotify Notification for a single UE

1. The GMLC shall send an HTTP POST to the locationNotificationUri to send a notification. The input parameters for the notification (Notification Correlation ID, UE (SUPI and if available GPSI), Type of location related event (e.g. deferred location for the UE available event, activation of location for periodic or triggered location, mobility of a target UE to a new AMF or MME for a deferred location, Geodetic Location, Local Location, Civic Location, Position Methods Used, serving LMF identification, integrity result, etc.) should be included in the HTTP POST request body.

If the GMLC receives the statistics on the location reporting over user plane (e.g., the number of location reports over user plane) from the AMF, the statistics on the location reporting over user plane shall be included in the HTTP POST contents.

The locationNotificationUri shall be set to:

If the notification is sent from (V)GMLC to (H)GMLC when roaming with (V)GMLC used,

- the hgmlcCallbackURI received from the AMF/LMF;

If the notification is sent from (H)GMLC to NEF, or other NF (e.g. NWDAF),

- the callback URI (i.e., eventNotificationUri) of NEF or other NF (e.g. NWDAF) provided by NEF or other NF (e.g. NWDAF) during requesting the ProvideLocation service operation for the periodic or triggered deferred location for a target UE or ;
- the callback URI of NEF locally provisioned in the (H)GMLC.

If there are more than one related UEs, EventNotifyData for each related UE is included.

If the notification is sent from the (V)GMLC to the (H)GMLC, the (V)GMLC shall include the nrppaPeriodicInd IE with the value true if received from the AMF. The (H)GMLC shall store the indication and include it in subsequent Cancel Location operation (see clause 5.2.2.4.1).

2a. If the notification is received, the NF Service Consumer shall reply with the status code 204 indicating the notification is received, in the response message.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.4.2.3.1-2 may be returned. For a 4xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.4.2.3.1-2.

5.2.2.5.3 EventNotify for the UEs in a target group

The service operation is used during the procedure:

- Bulk Operation of LCS Service Request Targeting to Multiple UEs (see 3GPP TS 23.273 [4], clause 6.8)

The EventNotify for the UEs in a target group enables the consumer NF (e.g. NEF, NWDAF) to get notified about the geodetic and optionally local and/or civic locations (immediate locations or deferred locations) for the UEs in target group, the failures of requesting location for the UEs in the target group, completion or activation of deferred location for the UEs in the target group. See Figure 5.2.2.5.3-1.

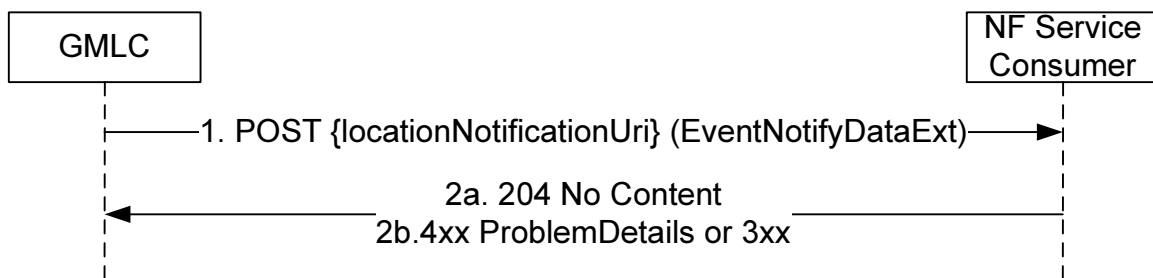


Figure 5.2.2.5.3-1: EventNotify Notification for the UEs in a target group

1. The GMLC/(H)GMLC shall send an HTTP POST to the locationNotificationUri to send a notification. The Request body shall contain event report(s) for one or more UEs in the group. The event report for each UE shall include the LDR Reference, UE identifier (SUPI or GPSI), location data (location data for immediate location service request or location data for deferred location service request) or failure cause of positioning. The locationNotificationUri shall be set to:

- the callback URI of NEF, or other NF (e.g. NWDAF) provided by NEF during requesting the ProvideLocation service operation for a target group of UEs or;
- the callback URI of NEF locally provisioned in the GMLC/(H)GMLC.

- 2a. If the notification is received, the NF Service Consumer shall reply with the status code 204 indicating the notification is received, in the response message.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.4.2.3.1-2 may be returned. For a 4xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.4.2.3.1-2.

5.2.2.6 LocationUpdateNotify

5.2.2.6.1 General

The service operation is used during the procedure:

- 5GC-MO-LR Procedure (see 3GPP TS 23.273 [4], clause 6.2)

The LocationUpdateNotify enables the NF consumer (e.g. NEF) to get notified about the UE location information update. See Figure 5.2.2.6.1-1.

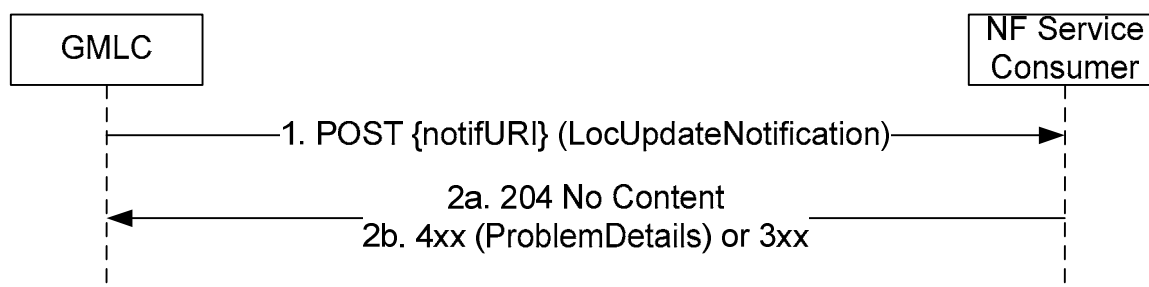


Figure 5.2.2.6.1-1: LocationUpdateNotify Notification

1. The GMLC shall send an HTTP POST request to the notifURI of the NF consumer (e.g. NEF). The response body shall contain a LocUpdateNotification object.

The notifURI (e.g. NEF address for callback) is locally configured on GMLC or discovered via NRF.

- 2a. On success, "204 No content" shall be returned by the NF consumer.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.4.3.3.1-2 may be returned. For a 4xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.4.3.3.1-2.

5.2.2.7 LocationUpdateSubscribe

5.2.2.7.1 General

This service operation is used by a NF Service Consumer (e.g. NEF) to trigger a subscription to notifications on UE location information update for the 5GC-MO-LR Procedure (see 3GPP TS 23.273 [4], clause 6.2). See Figure 5.2.2.7.1-1.

NOTE: This service operation is not used by the current stage 2 specifications in 3GPP TS 23.273 [4], i.e. the subscription to notifications on UE location information update is implicit.

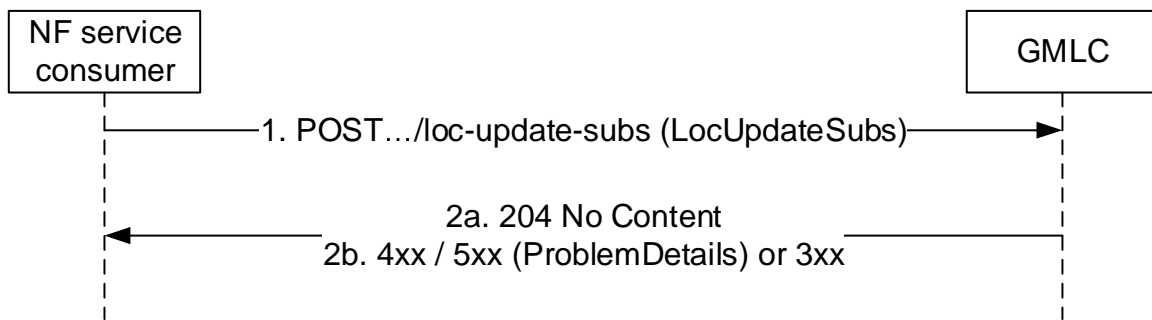


Figure 5.2.2.7.1-1: Subscription to UE location information update

1. The NF service consumer (e.g. NEF) sends a POST request to the parent resource, i.e. collection of subscriptions (.../loc-update-subs), to create a subscription to UE location information update for the 5GC-MO-LR Procedure, as provided in LocUpdateSubs information conveyed in the message body.
- 2a. On success, "204 No content" shall be returned by the GMLC.
- 2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.5.2-2 may be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.3.4.2-2.

5.2.2.8 PrivacyCheckIdMapping

5.2.2.8.1 General

The service operation is used during the procedure:

- SL-MT-LR Procedure (see 3GPP TS 23.273 [4], clause 6.20)

The PrivacyCheckIdMapping enables the NF consumer (e.g. H-GMLC) to perform the privacy check and ID mapping of a UE for Ranging SL service. See Figure 5.2.2.8.1-1.

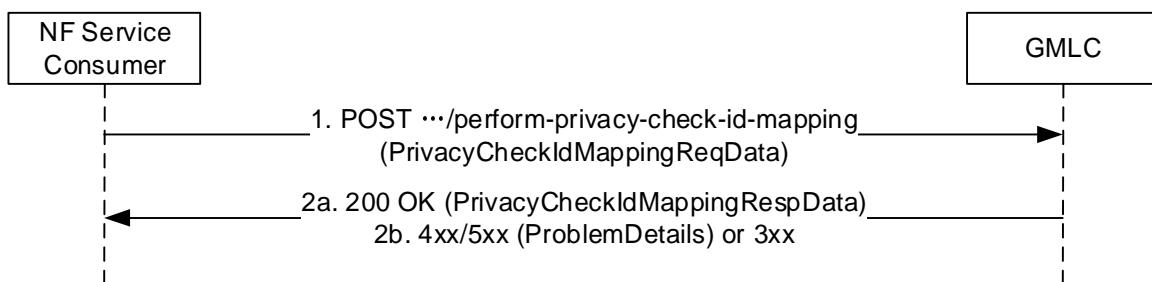


Figure 5.2.2.8.1-1: PrivacyCheckIdMapping Request/Response

1. The NF Service Consumer shall send an HTTP POST request to the URI associated with the "perform-privacy-check-id-mapping" custom operation. The request body shall contain a PrivacyCheckIdMappingReqData object.
- 2a. On success, i.e. the privacy check and ID mapping are successful, "200 OK" shall be returned by the GMLC. The response body shall include a PrivacyCheckIdMappingRespData object containing the information of ID mapping.
- 2b. On failure or redirection, one of the HTTP status codes listed in Table 6.1.3.6.2-2 may be returned. For 4xx/5xx status codes, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.3.6.2-2.

5.2.2.9 Void

6 API Definitions

6.1 Ngmlc_Location Service API

6.1.1 Introduction

The Ngmlc_Location service shall use the Ngmlc_Location API.

The API URI of the Ngmlc_Location API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests from the NF service consumer towards the NF service producer shall have the Resource URI structure defined in clause 4.4.1 of 3GPP TS 29.501 [6], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificResourceUriPart>

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [6].
- The <apiName> shall be "ngmlc-loc".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 6.1.3.

6.1.2 Usage of HTTP

6.1.2.1 General

HTTP/2, as defined in IETF RFC 9113 [8], shall be used as specified in clause 5 of 3GPP TS 29.500 [5].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [5].

HTTP messages and bodies for the Ngmlc_Location service shall comply with the OpenAPI [7] specification contained in Annex A.

6.1.2.2 HTTP standard headers

6.1.2.2.1 General

6.1.2.2.2 Content type

The following content types shall be supported:

- JSON, as defined in IETF RFC 8259 [9], 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 [5].
- The Problem Details JSON Object (IETF RFC 9457 [10]). The use of the Problem Details JSON object in a HTTP response body shall be signalled by the content type "application/problem+json".

6.1.2.3 HTTP custom headers

6.1.2.3.1 General

The following HTTP custom headers shall be supported:

- 3gpp-Sbi-Message-Priority: See 3GPP TS 29.500 [5], clause 5.2.3.2.2.

This API does not define any new HTTP custom headers.

6.1.3 Custom Operations without associated resources

6.1.3.1 Overview

The structure of the custom operation URIs of the Ngmlc_Location service is shown in Figure 6.1.3.1-1.

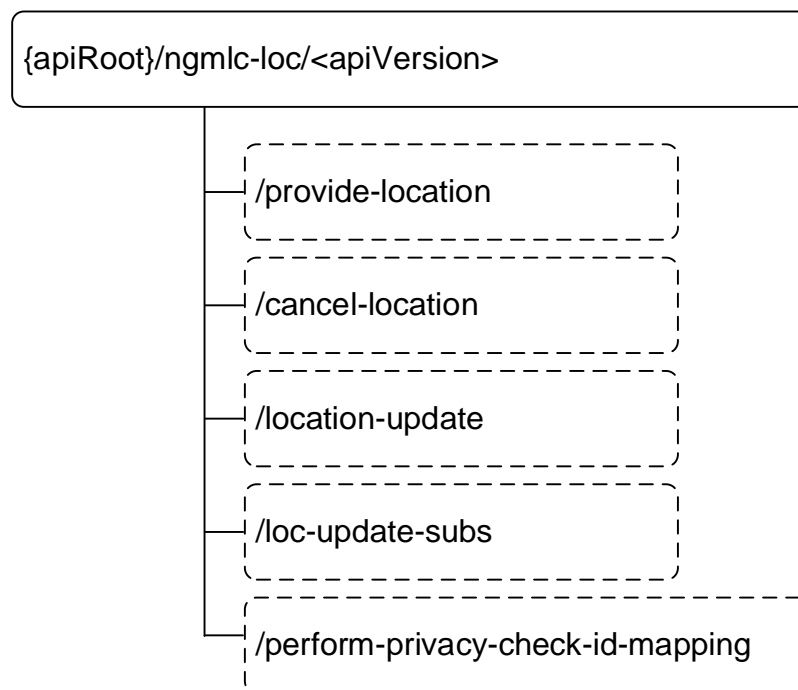


Figure 6.1.3.1-1: Custom operation URI structure of the Ngmlc_Location API

Table 6.1.3.1-1 provides an overview of the custom operations and applicable HTTP methods.

Table 6.1.3.1-1: Custom operations

| Custom operation URI | Mapped HTTP method | Description |
|---|--------------------|---|
| {apiRoot}/ngmlc-loc/<apiVersion>/provide-location | POST | Request or Subscribe the geodetic and optionally local and/or civic location of a target UE or a target group of UEs |
| {apiRoot}/ngmlc-loc/<apiVersion>/cancel-location | POST | Cancel an on-going periodic or triggered location request of a target UE or a target group of UEs |
| {apiRoot}/ngmlc-loc/<apiVersion>/location-update | POST | Enable the NF consumer to update UE location information towards the GMLC |
| {apiRoot}/ngmlc-loc/<apiVersion>/loc-update-subs | POST | Enable a NF service consumer (e.g. NEF) to subscribe to UE location information |
| {apiRoot}/ngmlc-loc/<apiVersion>/perform-privacy-check-id-mapping | POST | Enable a NF service consumer (e.g. H-GMLC) to perform the privacy check and ID mapping of a UE for Ranging SL service |

NOTE: The Custom operation URI above are deviating from the URI Path Segment Naming Conventions defined in clause 5.1.3.2 of 3GPP TS 29.501 [5], but they are not changed to maintain backwards compatibility.

6.1.3.2 Operation: provide-location

6.1.3.2.1 Description

This clause will describe the custom operation and what it is used for, and the custom operations URI.

6.1.3.2.2 Operation Definition

The operation shall support the response data structures and response codes specified in tables 6.1.3.2.2-1 and 6.1.3.2.2-2.

Table 6.1.3.2.2-1: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|-----------|---|-------------|--|
| InputData | M | 1 | Input parameters to the "Provide-Location" operation |

Table 6.1.3.2.2-2: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|---|---|-------------|---------------------------|---|
| LocationDataExt | M | 1 | 200 OK | This case represents the successful retrieval of the location of the UE or successful subscription of periodic or triggered location of the UE, or represents completely or partially accept of the requesting locations for a target group. Upon success, a response body is returned containing the different parameters of the location data if obtained, such as: <ul style="list-style-type: none"> - Geographic Area - Local Location - Civic Location - Age of Location - Accuracy of Location - Positioning methods |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors: <ul style="list-style-type: none"> - POSITIONING_DENIED - UNSPECIFIED - UNSUPPORTED_BY_UE - DETACHED_USER -- MAX_TARGET_UE_NUM_EXCEED See table 6.1.6.3-1 for the description of these errors. |
| ProblemDetails | O | 0..1 | 500 Internal Server Error | The "cause" attribute may be used to indicate the following application error: <ul style="list-style-type: none"> - POSITIONING_FAILED See table 6.1.6.3-1 for the description of these errors. |
| ProblemDetails | O | 0..1 | 501 Not Implemented | The "cause" attribute may be used to indicate one of the following application errors: <ul style="list-style-type: none"> - UNSUPPORTED_EVENT_TYPE |
| ProblemDetails | O | 0..1 | 504 Gateway Timeout | The "cause" attribute may be used to indicate the following application error: <ul style="list-style-type: none"> - UNREACHABLE_USER - PEER_NOT_RESPONDING See table 6.1.6.3-1 for the description of this error. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [5] other than those specified in the table above also apply, with a ProblemDetails data type when needed (see clause 5.2.7 of 3GPP TS 29.500 [5]). | | | | |

Table 6.1.3.2.2-3: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same GMLC or GMLC (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [5]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

Table 6.1.3.2-4: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same GMLC or GMLC (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [5]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

6.1.3.3 Operation: cancel-location

6.1.3.3.1 Description

This clause will describe the custom operation and what it is used for, and the custom operation's URI.

6.1.3.3.2 Operation Definition

This operation shall support the request and response data structures and response codes specified in table 6.1.3.3.2-1 and table 6.1.3.3.2-2.

Table 6.1.3.3.2-1: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|---------------|---|-------------|--|
| CancelLocData | M | 1 | The information is used to cancel deferred 5GC-MT-LR for a single UE or for a group of UE. |

Table 6.1.3.3.2-2: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|---|---|-------------|------------------------|---|
| n/a | | | 204 No Content | This case represents successful cancellation of location. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors: - UNSPECIFIED - LOCATION_SESSION_UNKNOWN See table 6.1.6.3-1 for the description of this error. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [5] other than those specified in the table above also apply, with a ProblemDetails data type when needed (see clause 5.2.7 of 3GPP TS 29.500 [5]). | | | | |

Table 6.1.3.3.2-3: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same GMLC or GMLC (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [5]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

Table 6.1.3.3.2-4: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same GMLC or GMLC (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [5]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

6.1.3.4 Operation: location-update

6.1.3.4.1 Description

This clause will describe the custom operation and what it is used for, and the custom operation's URI.

6.1.3.4.2 Operation Definition

This operation shall support the request and response data structures and response codes specified in table 6.1.3.4.2-1 and table 6.1.3.4.2-2.

Table 6.1.3.4.2-1: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|---------------|---|-------------|---|
| LocUpdateData | M | 1 | Input parameters to the "location-update" operation |

Table 6.1.3.4.2-2: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|---|---|-------------|------------------------|--|
| n/a | | | 204 No Content | This case represents successful update of location. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors: - UNSPECIFIED - UNREQUESTED_BY_UE - UNKNOWN_EXTERNAL_CLIENT_OR_AF - UNREACHABLE_EXTERNAL_CLIENT_OR_AF See table 6.1.6.3-1 for the description of this error. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [5] other than those specified in the table above also apply, with a ProblemDetails data type when needed (see clause 5.2.7 of 3GPP TS 29.500 [5]). | | | | |

Table 6.1.3.4.2-3: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same GMLC or GMLC (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [5]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

Table 6.1.3.4.2-4: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same GMLC or GMLC (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [5]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

6.1.3.5 Operation: loc-update-subs

6.1.3.5.1 Description

This clause will describe the custom operation and what it is used for, and the custom operations URI.

6.1.3.5.2 Operation Definition

The operation shall support the request and response data structures and response codes specified in tables 6.1.3.5.2-1 and 6.1.3.5.2-2.

Table 6.1.3.5.2-1: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|---------------|---|-------------|--|
| LocUpdateSubs | M | 1 | Contains the subscription to UE location update information that is to be created. |

Table 6.1.3.5.2-2: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|--|---|-------------|------------------------|--|
| n/a | | | 204 No Content | This case represents the successful UE location information subscription creation. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors: - UNSPECIFIED - UNREQUESTED_BY_UE See table 6.1.6.3-1 for the description of these errors. |
| NOTE: The mandatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [5] also apply. | | | | |

Table 6.1.3.5.2-3: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same GMLC or GMLC (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [5]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

Table 6.1.3.5.2-4: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same GMLC or GMLC (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [5]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

6.1.3.6 Operation: perform-privacy-check-id-mapping

6.1.3.6.1 Description

This clause will describe the custom operation and what it is used for, and the custom operation's URI.

6.1.3.6.2 Operation Definition

This operation shall support the request and response data structures and response codes specified in table 6.1.3.6.2-1 and table 6.1.3.6.2-2.

Table 6.1.3.6.2-1: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|------------------------------|---|-------------|--|
| PrivacyCheckIdMappingReqData | M | 1 | Input parameters to the "privacy-check-id-mapping" service operation |

Table 6.1.3.6.2-2: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|---|---|-------------|------------------------|--|
| PrivacyCheckIdMappingRespData | M | 1 | 200 OK | This case represents the successful result of the "privacy-check-id-mapping" service operation |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors: <ul style="list-style-type: none"> - ID_MAPPING_NOT_AVAILABLE - RANGING_SL_POS_NOT_ALLOWED - UNKNOWN_UE_IDENTIFIER - UNSPECIFIED See table 6.1.6.3-1 for the description of this error. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [5] other than those specified in the table above also apply, with a ProblemDetails data type when needed (see clause 5.2.7 of 3GPP TS 29.500 [5]). | | | | |

Table 6.1.3.6.2-3: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same GMLC or GMLC (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [5]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

Table 6.1.3.6.2-4: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same GMLC or GMLC (service) set. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [5]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

6.1.3.7 Void

6.1.4 Notifications

6.1.4.1 General

This clause specifies the notifications provided by the Ngmlc_Location service.

Table 6.1.4.1-1: Notifications overview

| Notification | Callback URI | HTTP method or custom operation | Description (service operation) |
|----------------------|---------------------------|---------------------------------|---------------------------------|
| EventNotify | {locationNotificationUri} | POST | |
| LocationUpdateNotify | {notifURI} | POST | |

6.1.4.2 Eventnotify

6.1.4.2.1 Description

The EventNotify operation is used to the occurrence of periodic or triggered location event for a target UE to a consumer NF (e.g. (H)GMLC, NEF, NWDAF) or used to report the locations (e.g. the immediate locations or deferred locations) for the UEs in a target group to a consumer NF (e.g. NEF, NWDAF).

6.1.4.2.2 Notification Definition

Call-back URI: {locationNotificationUri}

See clause 5.2.2.5 for the description of how the GMLC obtains the Call-back URI of the NF Service Consumer.

6.1.4.2.3 Notification Standard Methods

6.1.4.2.3.1 POST

This method sends a Location event notify to the NF Service Consumer.

This method shall support the request and response data structures and response codes specified in table 6.1.4.2.3.1-1 and table 6.1.4.2.3.1-2.

Table 6.1.4.2.3.1-1: Data structures supported by the POST Request Body

| Data type | P | Cardinality | Description |
|--------------------|---|-------------|--|
| EventNotifyDataExt | M | 1 | Input parameters to the "Event Notify" operation |

Table 6.1.4.2.3.1-2: Data structures supported by the POST Response Body

| Data type | P | Cardinality | Response codes | Description |
|---|---|-------------|------------------------|---|
| n/a | | | 204 No Content | This case represents successful notification of the event. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors: - UNSPECIFIED - LOCATION_SESSION_UNKNOWN See table 6.1.6.3-1 for the description of this error. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [5] other than those specified in the table above also apply, with a ProblemDetails data type when needed (see clause 5.2.7 of 3GPP TS 29.500 [5]). | | | | |

Table 6.1.4.2.3.1-3: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|--|
| Location | string | M | 1 | A URI pointing to the endpoint of NF service consumer to which the notification should be sent. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [5]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the notification is redirected |

Table 6.1.4.2.3.1-4: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|--|
| Location | string | M | 1 | A URI pointing to the endpoint of NF service consumer to which the notification should be sent. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [5]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the notification is redirected |

6.1.4.3 LocationUpdateNotify

6.1.4.3.1 Description

The LocationUpdateNotify operation is used to deliver the location update for a UE to a consumer NF (e.g. NEF).

6.1.4.3.2 Notification Definition

Call-back URI: {notifURI}

6.1.4.3.3 Notification Standard Methods

6.1.4.3.3.1 POST

This method sends a Location update notification to the NF Service Consumer.

This method shall support the request and response data structures and response codes specified in table 6.1.4.3.3.1-1 and table 6.1.4.3.3.1-2.

Table 6.1.4.3.3.1-1: Data structures supported by the POST Request Body

| Data type | P | Cardinality | Description |
|-----------------------|---|-------------|--|
| LocUpdateNotification | M | 1 | Input parameters to the "LocationUpdateNotification" operation |

Table 6.1.4.3.3.1-2: Data structures supported by the POST Response Body

| Data type | P | Cardinality | Response codes | Description |
|------------------|---|-------------|------------------------|--|
| n/a | | | 204 No Content | This case represents successful notification of the event. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors: - UNSPECIFIED - UNKOWN_EXTERNAL_CLIENT_OR_AF - UNREACHABLE_EXTERNAL_CLIENT_OR_AF See table 6.1.6.3-1 for the description of this error. |

NOTE: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [5] other than those specified in the table above also apply, with a ProblemDetails data type when needed (see clause 5.2.7 of 3GPP TS 29.500 [5]).

Table 6.1.4.3.3.1-3: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|--|
| Location | string | M | 1 | A URI pointing to the endpoint of NF service consumer to which the notification should be sent. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [5]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the notification is redirected |

Table 6.1.4.3.3.1-4: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|--|
| Location | string | M | 1 | A URI pointing to the endpoint of NF service consumer to which the notification should be sent. For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [5]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the notification is redirected |

6.1.5 Data Model

6.1.5.1 General

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

Table 6.1.5.1-1 specifies the data types defined for the Ngmlc_Location service based interface protocol.

Table 6.1.5.1-1: Ngmlc_Location specific Data Types

| Data type | Clause defined | Description | Applicability |
|---------------------------------|----------------|--|---------------|
| InputData | 6.1.5.2.2 | the input parameters in ProvideLocation service operation | |
| LocationData | 6.1.5.2.3 | Location data | |
| CancelLocData | 6.1.5.2.4 | the input parameters in CancelLocation service operation | |
| LocUpdateData | 6.1.5.2.5 | the input parameters in LocationUpdate service operation | |
| EventNotifyData | 6.1.5.2.6 | the input parameters for the target UE in EventNotify Notification service operation | |
| UePrivacyRequirements | 6.1.5.2.7 | UE privacy requirements from (H)GMLC to the serving AMF or VGMLC(in the roaming case) for the target UE | |
| LocUpdateNotification | 6.1.5.2.9 | Location Update Notification | |
| LocUpdateSubs | 6.1.5.2.10 | UE location information subscription | |
| EventNotifyDataAdditionalInfo | 6.1.5.2.11 | Additional information to Event Notify Data | |
| EventNotifyDataExt | 6.1.5.2.12 | Extended Event Notify Data for UEs of a target group | |
| AreaEventInfoAddition | 6.1.5.2.13 | Additional information for Extended Area event information | |
| AreaEventInfoExt | 6.1.5.2.14 | Extended Area Event Information | |
| IntegrityRequirements | 6.1.5.2.15 | Integrity requirements | |
| AlertLimit | 6.1.5.2.16 | Alert Limit | |
| UpLocRepInfoAf | 6.1.5.2.17 | Information for the location reporting over user plane | |
| UpCumEvtRptCriteria | 6.1.5.2.18 | Criteria for sending cumulative events reports over control plane | |
| AddLocationDatas | 6.1.5.2.19 | Additional location data | |
| LocationDataExt | 6.1.5.2.20 | the response parameters in ProvideLocation service operation including one or more LocationData | |
| RelatedUe | 6.1.5.2.21 | Indicates information for related UE for ranging and sidelink positioning | |
| PrivacyCheckIdMappingReqData | 6.1.5.2.22 | Privacy Check ID Mapping Request Data | |
| PrivacyCheckIdMappingRespData | 6.1.5.2.23 | Privacy Check ID Mapping Response Data | |
| IntegrityProtectionLevel | 6.1.5.2.27 | Integrity Protection Level | |
| IntegrityResult | 6.1.5.2.28 | Integrity Result | |
| UpLocRepAddrAf | 6.1.5.2.29 | AF address for location reporting over user plane | |
| ServiceIdentity | 6.1.5.3.2 | service identity | |
| CodeWord | 6.1.5.3.2 | codeword | |
| ExternalClientIdentification | 6.1.5.3.2 | external client identification | |
| E164CountryCodeOfGeographicArea | 6.1.5.3.2 | E.164 country codes for geographic areas | |
| LcsServiceTypeId | 6.1.5.3.2 | LCS Service Type Id | |
| TimeToAlert | 6.1.5.3.2 | Time-to-Alert | |
| TargetIntegrityRisk | 6.1.5.3.2 | Target Integrity Risk | |
| HorizontalProtectionLevel | 6.1.5.3.2 | Horizontal Protection Level | |
| VerticalProtectionLevel | 6.1.5.3.2 | Vertical Protection Level | |
| PseudonymIndicator | 6.1.5.3.3 | It defines if a pseudonym is requested | |
| LocationRequestType | 6.1.5.3.4 | NI-LR, MT-LR or MO-LR | |
| LocationTypeRequested | 6.1.5.3.5 | the location type requested by the LCS client | |
| EventNotifyDataType | 6.1.5.3.6 | the type of event that triggers event notification | |
| FailureCause | 6.1.5.3.7 | Positioning failure cause | |
| SuccessType | 6.1.5.3.8 | Success Type to indicate full or partial success | |
| ReportingInd | 6.1.5.3.9 | Reporting indication on how a target UE sends event reports when the UE is outside the event report allowed area | |

| | | | |
|--------------------------|------------|----------------------------|--|
| IntegrityComputingEntity | 6.1.5.3.10 | Integrity Computing Entity | |
|--------------------------|------------|----------------------------|--|

Table 6.1.5.1-2 specifies data types re-used by the Ngmlc_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 Ngmlc_Location service based interface.

Table 6.1.5.1-2: Ngmlc_Location re-used Data Types

| Data type | Reference | Comments | Applicability |
|-------------------------------|---------------------|--|---------------|
| Gpsi | 3GPP TS 29.571 [11] | | |
| Supi | 3GPP TS 29.571 [11] | | |
| Uri | 3GPP TS 29.571 [11] | | |
| Amfld | 3GPP TS 29.571 [11] | | |
| NflInstanceId | 3GPP TS 29.571 [11] | | |
| ExternalClientType | 3GPP TS 29.572 [12] | | |
| LocationQoS | 3GPP TS 29.572 [12] | | |
| LcsQosClass | 3GPP TS 29.572 [12] | | |
| SupportedGADShapes | 3GPP TS 29.572 [12] | | |
| PeriodicEventInfo | 3GPP TS 29.572 [12] | | |
| AreaEventInfo | 3GPP TS 29.572 [12] | | |
| MotionEventInfo | 3GPP TS 29.572 [12] | | |
| LdrType | 3GPP TS 29.572 [12] | | |
| LdrReference | 3GPP TS 29.572 [12] | | |
| AgeOfLocationEstimate | 3GPP TS 29.572 [12] | | |
| PositioningMethod | 3GPP TS 29.572 [12] | | |
| AccuracyFulfilmentIndicator | 3GPP TS 29.572 [12] | | |
| LMFIdentification | 3GPP TS 29.572 [12] | | |
| LcsServiceType | 3GPP TS 29.572 [12] | | |
| VelocityRequested | 3GPP TS 29.572 [12] | | |
| LcsPriority | 3GPP TS 29.572 [12] | | |
| VelocityEstimate | 3GPP TS 29.572 [12] | | |
| TerminationCause | 3GPP TS 29.572 [12] | | |
| PositioningMethodAndUsage | 3GPP TS 29.572 [12] | | |
| GnssPositioningMethodAndUsage | 3GPP TS 29.572 [12] | | |
| LcsServiceAuth | 3GPP TS 29.571 [11] | | |
| Ecgi | 3GPP TS 29.571 [11] | | |
| Ncgi | 3GPP TS 29.571 [11] | | |
| Altitude | 3GPP TS 29.572 [12] | Altitude | |
| BarometricPressure | 3GPP TS 29.572 [12] | Barometric pressure | |
| MinorLocationQoS | 3GPP TS 29.572 [12] | Minor Location QoS | MUTIQOS |
| LocationPrivacyVerResult | 3GPP TS 29.518 [20] | | |
| ExternalGroupId | 3GPP TS 29.571 [11] | External Group Identifier | |
| GroupId | 3GPP TS 29.571 [11] | Group Identifier | |
| CivicAddress | 3GPP TS 29.572 [12] | Civic Address | |
| GeographicArea | 3GPP TS 29.572 [12] | Geographic Area | |
| LocalArea | 3GPP TS 29.572 [12] | Local area specified by different shape | |
| RedirectResponse | 3GPP TS 29.571 [11] | | |
| DateTime | 3GPP TS 29.571 [11] | Date and Time | |
| Ipv4Addr | 3GPP TS 29.571 [11] | IPv4 Address | |
| Ipv6Addr | 3GPP TS 29.571 [11] | IPv6 Address | |
| Fqdn | 3GPP TS 29.571 [11] | Fully Qualified Domain Name | |
| LpHapType | 3GPP TS 29.518 [20] | Type of Low Power and/or High Accuracy Positioning | |
| HighAccuracyGnssMetrics | 3GPP TS 29.572 [12] | High Accuracy GNSS Metrics | |
| LosNlosMeasureInd | 3GPP TS 29.572 [12] | LOS/NLOS measurement indication | |
| IndoorOutdoorInd | 3GPP TS 29.572 [12] | Indicates an area for event reporting | |
| RangingSIResult | 3GPP TS 29.572 [12] | Indicates result type for ranging and sidelink positioning | |
| RelatedUeType | 3GPP TS 29.572 [12] | Indicates type for related UE for ranging and sidelink positioning | |
| RangeDirection | 3GPP TS 29.572 [12] | Represents the distance and direction between two points. | |
| 2DRelativeLocation | 3GPP TS 29.572 [12] | Represents 2D local co-ordinates with origin corresponding to another known point. | |

| | | | |
|----------------------|---------------------|---|--|
| 3DRelativeLocation | 3GPP TS 29.572 [12] | Represents 3D local coordinates with origin corresponding to another known point. | |
| MappedLocationQoSeps | 3GPP TS 29.572 [12] | Mapped Location QoS for EPS | |
| ApplicationlayerId | 3GPP TS 29.571 [11] | Application Layer ID | |

6.1.5.2 Structured data types

6.1.5.2.1 Introduction

This clause defines the structures to be used in resource representations.

6.1.5.2.2 Type: InputData

Table 6.1.5.2.2-1: Definition of type InputData

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--------------------|--|---|-------------|--|---------------|
| gpsi | Gpsi | O | 0..1 | Generic Public Subscription Identifier (NOTE 3). | |
| supi | Supi | O | 0..1 | Subscription Permanent Identifier (NOTE 3). | |
| appLayerId | ApplicationlayerId | O | 0..1 | Application Layer ID (NOTE 3). | Ranging_SL |
| extGroupId | ExternalGroupId | O | 0..1 | This IE may be present when requesting LCS service for a group of target UEs, if present this IE shall contain the External Group ID (NOTE 3). | |
| intGroupId | GroupId | O | 0..1 | This IE may be present when requesting LCS service for a group of target UEs, if present this IE shall contain the Internal Group ID (NOTE 3). | |
| externalClientType | ExternalClientType | M | 1 | This IE shall contain LCS client type | |
| locationQoS | LocationQoS | O | 0..1 | Requested location QoS Multiple QoS Class (lcsQoSClass sets to "MULTIPLE_QOS") shall only be used when GMLC support MUTIQOS feature. | |
| supportedGADShapes | array(SupportedGADShapes) | O | 1..N | Supported Geographical Area Description shapes | |
| serviceIdentity | ServiceIdentity | O | 0..1 | Service identity | |
| serviceCoverage | array(E164CountryCodeOfGeographicArea) | O | 1..N | A list of E.164 country codes for geographic areas (see ITU Recommendation E.164 [13]) where the LCS client is permitted to request and receive UE location information. | |
| ldrType | LdrType | C | 0..1 | Location deferred request event type. This IE shall be present when request deferred 5GC MT LCS service. | |
| periodicEventInfo | PeriodicEventInfo | C | 0..1 | Periodic event information of the location request for a target UE. This IE shall be present when ldrType is set to "PERIODIC". | |
| areaEventInfo | AreaEventInfoExt | C | 0..1 | Area event information of the location request for a target UE. This IE shall be present when ldrType is set to "ENTERING_INTO_AREA", "LEAVING_FROM_AREA" or "BEING_INSIDE_AREA". | |
| motionEventInfo | MotionEventInfo | C | 0..1 | Motion event information of the location request for a target UE. This IE shall be present when ldrType is set to "MOTION". | |

| | | | | | |
|------------------------------|------------------------------|---|------|---|--|
| ldrReference | LdrReference | C | 0..1 | Notification correlation ID It shall be present in the request from NEF if it is allocated by NEF for the Deferred 5GC-MT-LR procedure. It shall be present in the request from NEF for requesting location service for a group of UEs. It shall be present in the request to VGMLC for the Deferred 5GC-MT-LR procedure. This IE shall be present for location service in PNI-NPN with signalling optimisation, as specified in 3GPP TS 23.273 [4] clause 6.1.2. | |
| hgmlcCallbackUri | Uri | O | 0..1 | Notification target address for HGMLC This IE shall also be present for location service in PNI-NPN with signalling optimisation, as specified in 3GPP TS 23.273 [4] clause 6.1.2 | |
| eventNotificationUri | Uri | O | 0..1 | The call-back Uri of NF service consumer (i.e. NEF, NWDAF) for implicit subscription to notification of Eventnotify. This IE should be included and is used to receive the location information for UEs in the group when requesting LCS service for a group of target UEs or requesting deferred 5GC MT LCS service for a single UE. | |
| externalClientIdentification | ExternalClientIdentification | O | 0..1 | External LCS client identification | |
| afId | string | O | 0..1 | The identification of AF that initiated location request | |
| uePrivacyRequirements | UePrivacyRequirements | O | 0..1 | UE privacy requirement | |
| lcsServiceType | LcsServiceType | O | 0..1 | LCS service type This IE may be present when being sent from HGMLC to VGMLC. When present, it shall contain the LCS service type, which is mapped from attribute serviceIdentity of the LCS Request by the HGMLC. | |
| velocityRequested | VelocityRequested | O | 0..1 | Velocity of the target UE is requested | |
| priority | LcsPriority | O | 0..1 | Priority of the location request | |
| locationTypeRequested | LocationTypeRequested | O | 0..1 | Requested type of location, applicable to location immediate request (NOTE 2) | |
| maximumAgeOfLocationEstimate | AgeOfLocationEstimate | O | 0..1 | Requested maximum age of the location estimate | |
| amfId | AmfId | O | 0..1 | The identification of serving AMF | |
| codeWord | CodeWord | O | 0..1 | Code word (NOTE 1) | |
| scheduledLocTime | DateTime | O | 0..1 | The scheduled time (in UTC) for location determination | |

| | | | | | |
|--------------------------|------------------------|---|------|--|------------|
| reliableLocReq | boolean | C | 0..1 | <p>This IE shall be included with the value "true" to indicate that reliable UE location information is required, as specified in 3GPP TS 33.256 [22] clause 5.3.2.</p> <p>When present, this IE shall be set as following:</p> <ul style="list-style-type: none"> - true: the reliable UE location information is required - false (default): the reliable UE location information is not required | |
| servingLmfId | LMFIdentification | O | 0..1 | If present, this IE contains the identification of a serving LMF selected by the GMLC. | |
| lpHapType | LpHapType | C | 0..1 | This IE shall be included and set to "LOW_POW_HIGH_ACCU_POS" to request low power and high accuracy positioning, as specified in clause 6.1.2 of 3GPP TS 23.273 [4]. | |
| evtRptExpectedArea | GeographicArea | O | 0..1 | <p>This IE shall be present in the request from H-GMLC to V-GMLC if the event report expected area was retrieved from UDM.</p> <p>When present, this IE shall indicate the event report expected area.</p> | |
| reportingInd | ReportingInd | C | 0..1 | <p>This IE shall be present in the request from H-GMLC to V-GMLC if the area usage indication is provided by UDM and event report expected area is present.</p> <p>When present, this IE shall indicate whether the UE is allowed to generate and send the reports inside or outside the event report expected area:</p> <ul style="list-style-type: none"> - Inside reporting (default) - Outside reporting <p>(see 3GPP TS 23.273 [4] clause 5.14 and 6.3.1)</p> | |
| integrityRequirements | IntegrityRequirements | O | 0..1 | When present, this IE shall indicate the integrity requirements. | |
| upLocRepInfoAf | UpLocRepInfoAf | C | 0..1 | This IE shall be present if the request is for the location reporting over user plane. When present, the IE may include additional information for the location reporting over user plane. See clause 6.16 of 3GPP TS 23.273 [4]. | |
| requestedRangingSIResult | array(RangingSIResult) | O | 1..N | When present, this IE shall contain the type of result requested for ranging and sidelink positioning, such as absolute locations, relative locations or distances and directions related to the UEs, etc. | Ranging_SL |

| | | | | | |
|--|----------------------|---|------|--|------------|
| relatedUes | array(RelatedUe) | O | 1..N | When present, this IE contains a list of the information for the related UEs for the ranging and sidelink positioning. | Ranging_SL |
| mappedQoSeps | MappedLocationQoSeps | O | 0..1 | This IE may only be present in the service request from H-GMLC to V-GMLC, if the Multiple QoS Class is indicated in the locationQoS IE. When present, this IE shall indicate the mapped Location QoS applicable to EPS ("BEST_EFFORT" or "ASSURED") based on the Multiple Location QoS (see clause 6.19 of 3GPP TS 23.273 [4]). | MUTIQOS |
| coordinateID | integer | O | 0..1 | This IE may be present when requestedRangingSIResult indicates "ABSOLUTE_LOCATION". When present, this IE represents a local coordinate (see clause 6.20.3 of 3GPP TS 23.273 [4]). | Ranging_SL |
| mbsrPosInd | boolean | C | 0..1 | This attribute shall be present and set to true when the GMLC is requested to derive the location of the MBSR for the purpose of determining the location of a target UE served by the MBSR. Otherwise, this attribute shall be absent. | MBSR |
| mwabInd | boolean | C | 0..1 | This attribute shall be present and set to true when the GMLC is requested to derive the location of the MWAB-UE using the UE-ID of the MWAB-UE. Otherwise, this attribute shall be absent. | MWAB |
| <p>NOTE 1: Checking of the Codeword in UE applies only when the Codeword parameter is present and when the codeWordCheck parameter (specified in clause 6.1.5.2.7) is present and set to TRUE.</p> <p>NOTE 2: If the LocationTypeRequested parameter is set to value "NOTIFICATION_VERIFICATION_ONLY", then the lcsServiceAuthInfo attribute in the uePrivacyRequirements IE, if present, shall be set to either "NOTIFICATION_ONLY" or "NOTIFICATION_AND_VERIFICATION_ONLY".</p> <p>NOTE 3: If retrieving the location for a target UE, the UE identification (attributes gpsi and/or supi or appLayerId) shall be included, if retrieving the UE locations for a target group, the group identification (attributes extGroupId and/or intGroupId), UE identification and group identification shall be included exclusively.</p> | | | | | |

6.1.5.2.3 Type: LocationData

Table 6.1.5.2.3-1: Definition of type LocationData

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------------------|--------------------------------------|---|-------------|---|---------------|
| gpsi | Gpsi | O | 0..1 | Generic Public Subscription Identifier | |
| supi | Supi | O | 0..1 | Subscription Permanent Identifier | |
| locationEstimate | GeographicArea | O | 0..1 | Geographic area of the target UE | |
| civicAddress | CivicAddress | O | 0..1 | Civic address of the target UE | |
| localLocationEstimate | LocalArea | O | 0..1 | When present, this IE shall indicate a local area in referencesystem. | |
| ageOfLocationEstimate | AgeOfLocationEstimate | O | 0..1 | Age of location estimate | |
| timestampOfLocationEstimate | DateTime | O | 0..1 | When present, this IE shall indicate the estimated UTC time when the location estimate corresponded to the UE location (i.e. when the location estimate and the actual UE location was the same). | |
| positioningDataList | array(PositioningMethodAndUsage) | O | 1..N | If present, this IE shall indicate the usage of each non-GANSS positioning method that was attempted to determine the location estimate, either successfully or unsuccessfully. | |
| gnssPositioningDataList | array(GnssPositioningMethodAndUsage) | O | 1..N | If present, this IE shall indicate the usage of each GANSS positioning method that was attempted to determine the location estimate, either successfully or unsuccessfully. | |
| accuracyFulfillmentIndicator | AccuracyFulfillmentIndicator | O | 0..1 | The indication whether the obtained location estimate satisfies the requested accuracy or not | |
| ueVelocity | VelocityEstimate | O | 0..1 | Responded UE velocity, if requested and available | |
| ldrReference | LdrReference | C | 0..1 | Notification correlation ID It shall be present in the response to NEF if it is allocated by HGMLC for the the Deferred 5GC-MT-LR procedure. | |
| altitude | Altitude | C | 0..1 | If present, this IE indicates the altitude of the positioning estimate. This IE shall be sent from (V)GMLC to (H)GMLC if received by VGMLC from AMF when roaming. | |
| servingLMFIdentification | LMFIdentification | C | 0..1 | If present, this IE contains the identification of a serving LMF for periodic or triggered location. This IE shall be sent from (V)GMLC to (H)GMLC if received by VGMLC from AMF when roaming. | |

| | | | | | |
|--------------------------|--------------------------|---|------|---|---------|
| locationPrivacyVerResult | LocationPrivacyVerResult | C | 0..1 | <p>If present, this IE contains the result of location privacy verification by UE.</p> <p>The IE shall be included from (V)GMLC to (H)GMLC if received from the serving AMF by (V)GMLC when roaming and a location request with notification and privacy verification only indication is sent to the serving AMF via (V)GMLC by (H)GMLC during location request procedure.</p> | |
| successType | SuccessType | C | 0..1 | <p>This IE is only used for requesting LCS service for a group, and shall be present to indicate one of the following values.</p> <ul style="list-style-type: none"> - SUCCESS_COMPLETELY - SUCCESS_PARTIALLY <p>The value "SUCCESS_COMPLETELY" indicates that requesting/subscribing to LCS service is successful for all the UE(s) within the group identified by the external/internal group ID.</p> <p>The value "SUCCESS_PARTIALLY" indicates that requesting/subscribing to LCS service is only successful for a part of the UE(s) within the group identified by the external/internal group ID.</p> <p>The default value of this attribute is "SUCCESS_COMPLETELY" if this IE is not present.</p> | |
| achievedQos | MinorLocationQoS | O | 0..1 | <p>When present, this IE shall contain the achieved Location QoS Accuracy of the estimated location.</p> <p>This IE shall be present if received.</p> | MUTIQOS |
| directReportInd | boolean | C | 0..1 | <p>When present, this IE shall be set for the following value:</p> <ul style="list-style-type: none"> - true: location determination will be sent by LMF to GMLC directly - false (default): location determination will not be sent by LMF to GMLC directly <p>This IE shall be present if received from LMF.</p> | |

| | | | | | |
|---------------------------|-------------------------|---|------|---|------------|
| acceptedPeriodicEventInfo | PeriodicEventInfo | C | 0..1 | This IE shall be present if received from AMF/LMF. When present, this IE shall provide the accepted periodic event reporting information. | |
| haGnssMetrics | HighAccuracyGnssMetrics | C | 0..1 | This IE shall be present when high accuracy GNSS metrics are received from LMF/AMF. When present, this IE shall indicate the high accuracy GNSS metrics for the location estimate. | |
| losNlosMeasureInd | LosNlosMeasureInd | O | 0..1 | When present, this IE shall indicate whether LOS measurement or NLOS measurement is used. | |
| indoorOutdoorInd | IndoorOutdoorInd | O | 0..1 | When present, this IE shall indicate whether the UE is indoor or outdoor. | |
| relatedApplicationLayerId | ApplicationLayerId | O | 0..1 | Identifies the application layer ID of the related UE for ranging and sidelink positioning, such as located UE, reference UE, etc. | Ranging_SL |
| distanceDirection | RangeDirection | O | 0..1 | When present, this IE identifies a distance and direction from a point A to a point B, comprising a distance from point A to point B, an azimuth direction from point A to point B and an elevation direction from point A to point B. | Ranging_SL |
| 2dRelativeLocation | 2DRelativeLocation | O | 0..1 | When present, this IE identifies a relative 2D location with uncertainty ellipse, characterised by a point described in 2D local co-ordinates with origin corresponding to another known point, distances r1 and r2 and an angle of orientation A. | Ranging_SL |
| 3dRelativeLocation | 3DRelativeLocation | O | 0..1 | When present, this IE identifies a relative 3D location with uncertainty ellipsoid, characterised by a point described in 3D local co-ordinates with origin corresponding to another known point, distances r1 (the "semi-major uncertainty"), r2 (the "semi-minor uncertainty") and r3 (the "vertical uncertainty") and an angle of orientation A (the "angle of the major axis"). | Ranging_SL |

| | | | | | |
|------------------|------------------|---|------|--|------------|
| relativeVelocity | VelocityEstimate | O | 0..1 | When present, this IE identifies UE velocity relative to the UE identified with relatedApplicationlayerId. | Ranging_SL |
| integrityResult | IntegrityResult | C | 0..1 | This IE shall be present when the integrity requirements are present in the request and the integrity result is available. When present, this IE shall indicate the integrity result. | |

6.1.5.2.4 Type: CancelLocData

Table 6.1.5.2.4-1: Definition of type CancelLocData

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|-------------------|---|-------------|---|---------------|
| supi | Supi | O | 0..1 | This IE may be present when requesting cancellation of LCS service for a single UE. When present, this IE shall contain the Subscription Permanent Identifier of the target UE. (NOTE). | |
| gpsi | Gpsi | O | 0..1 | This IE may be present when requesting cancellation of LCS service for a single UE. When present, this IE shall contain the Generic Public Subscription identifier of the target UE. (NOTE). | |
| extGroupld | ExternalGroupld | O | 0..1 | This IE may be present when requesting cancellation of LCS service for a group of target UEs. When present this IE shall contain the External Group ID (NOTE). | |
| intGroupld | Groupld | O | 0..1 | This IE may be present when requesting cancellation of LCS service for a group of target UEs. When present this IE shall contain the Internal Group ID (NOTE). | |
| hgmlcCallBackUri | Uri | M | 1 | Notification target address | |
| ldrReference | LdrReference | M | 1 | LDR Reference | |
| lmfIdentification | LMFIdentification | O | 0..1 | The latest LMF identification received | |
| amfld | Amfld | O | 0..1 | The identification of the serving AMF | |
| nrppaPeriodicInd | boolean | C | 0..1 | This IE shall be present with the value true in request sent from the (H)GMLC to the (V)GMLC, if the indication was previously received and stored in the (H)GMLC. Presence of this IE with the value false shall be prohibited. | |
| NOTE: If cancelling the location for a target UE, the UE identification (attributes gpsi and/or supi) shall be included, if cancelling the UE locations for a target group, the group identification (attributes extGroupld and/or intGroupld), UE identification and group identification shall be included exclusively. | | | | | |

6.1.5.2.5 Type: LocUpdateData

Table 6.1.5.2.5-1: Definition of type LocUpdateData

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------------------|------------------------------|---|-------------|--|---------------|
| supi | Supi | O | 0..1 | Subscription Permanent Identifier | |
| gpsi | Gpsi | O | 0..1 | Generic Public Subscription Identifier | |
| pseudonymIndicator | PseudonymIndicator | O | 0..1 | Pseudonym indicator | |
| locationRequestType | LocationRequestType | M | 1 | Event causing the location estimate (5GC-MO-LR) | |
| locationEstimate | GeographicArea | M | 1 | Geographic area of the target UE | |
| ageOfLocationEstimate | AgeOfLocationEstimate | M | 1 | Age of location estimate | |
| timestampOfLocationEstimate | DateTime | O | 0..1 | When present, this IE shall indicate the estimated UTC time when the location estimate corresponded to the UE location (i.e. when the location estimate and the actual UE location was the same). | |
| accuracyFulfillmentIndicator | AccuracyFulfillmentIndicator | M | 1 | The indication whether the obtained location estimate satisfies the requested accuracy or not | |
| civicAddress | CivicAddress | O | 0..1 | Civic address of the target UE | |
| lcsQosClass | LcsQosClass | M | 1 | The LCS QoS Class requested by the target UE | |
| externalClientIdentification | ExternalClientIdentification | O | 0..1 | Identity of the LCS client | |
| afId | string | O | 0..1 | Identity of the AF | |
| gmlcNumber | string | C | 0..1 | <p>This IE shall be included by the AMF in the request to V-GMLC, if the "mlc-number" IE is received in MO request from the UE.</p> <p>When present, this IE shall contain the GMLC Number (in E.164 international number format) indicated in the "mlc-number" IE of the MO request from the UE. The V-GMLC may query NRF to obtain the H-GMLC using the GMLC Number.</p> <p>Pattern: "[^][0-9]{5,15}\$"</p> | |
| lcsServiceType | LcsServiceTypeId | O | 0..1 | <p>When present, this IE shall contain the LCS Service Type received from the UE, as specified in clause 6.2 of 3GPP TS 23.273 [4].</p> <p>When received, the H-GMLC shall map the received LCS Service Type to the Service Identity in Location Update Notification.</p> | |

6.1.5.2.6 Type: EventNotifyData

Table 6.1.5.2.6-1: Definition of type EventNotifyData

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-----------------------------|--------------------------------------|---|-------------|--|---------------|
| supi | Supi | O | 0..1 | Subscription Permanent Identifier | |
| gpsi | Gpsi | O | 0..1 | Generic Public Subscription Identifier | |
| ldrReference | LdrReference | M | 1 | LDR Reference | |
| eventNotifyDataType | EventNotifyDataType | M | 1 | The type of event that triggers event notification | |
| locationEstimate | GeographicArea | O | 0..1 | Geographic area of the target UE | |
| civicAddress | CivicAddress | O | 0..1 | Civic address of the target UE | |
| localLocationEstimate | LocalArea | O | 0..1 | When present, this IE shall indicate a local area in reference system. | |
| ageOfLocationEstimate | AgeOfLocationEstimate | O | 0..1 | Age of location estimate | |
| timestampOfLocationEstimate | DateTime | O | 0..1 | When present, this IE shall indicate the estimated UTC time when the location estimate corresponded to the UE location (i.e. when the location estimate and the actual UE location was the same). | |
| positioningDataList | array(PositioningMethodAndUsage) | O | 1..N | If present, this IE shall indicate the usage of each non-GANSS positioning method that was attempted to determine the location estimate, either successfully or unsuccessfully. | |
| gnssPositioningDataList | array(GnssPositioningMethodAndUsage) | O | 1..N | If present, this IE shall indicate the usage of each GANSS positioning method that was attempted to determine the location estimate, either successfully or unsuccessfully. | |
| lmfId | LMFIdentification | O | 0..1 | LMF identification that stores the location context of the target UE | |
| amfId | AmfId | O | 0..1 | The identification of AMF that is serving the target UE | |
| terminationCause | TerminationCause | C | 0..1 | The IE shall be included if event reporting has been terminated | |
| velocityEstimate | VelocityEstimate | C | 0..1 | If present, this IE contain an estimate of the velocity of the target UE, composed by horizontal speed, vertical speed, and their respective uncertainty. This IE shall be sent from (V)GMLC to (H)GMLC if received by VGMLC from AMF when roaming. | |
| altitude | Altitude | C | 0..1 | If present, this IE indicates the altitude of the positioning estimate. This IE shall be sent from (V)GMLC to (H)GMLC if received by VGMLC from AMF when roaming. | |

| | | | | | |
|-----------------------------|-----------------------------|---|------|--|------------|
| targetNode | NfInstanceld | C | 0..1 | For mobility of a UE with periodic or triggered location, this IE contains the address of the new serving node and shall be sent from (V)GMLC to (H)GMLC if received by VGMLC from AMF when roaming. | |
| accuracyFulfilmentIndicator | AccuracyFulfilmentIndicator | O | 0..1 | The indication whether the obtained location estimate satisfies the requested accuracy or not | |
| failureCause | FailureCause | C | 0..1 | This IE shall contain the failure cause for the UE if present. The IE shall be included if positioning has failed for the target UE in the target group. | |
| achievedQos | MinorLocationQoS | O | 0..1 | When present, this IE shall contain the achieved Location QoS Accuracy of the estimated location. This IE shall be present if received. | MUTIQOS |
| haGnssMetrics | HighAccuracyGnssMetrics | C | 0..1 | This IE shall be present when high accuracy GNSS metrics are received from LMF/AMF. When present, this IE shall indicate the high accuracy GNSS metrics for the location estimate. | |
| losNlosMeasureInd | LosNlosMeasureInd | O | 0..1 | When present, this IE shall indicate whether LOS measurement or NLOS measurement is used. | |
| upLocRepStatAf | integer | O | 0..1 | When present, this IE contains the number of event reports have transferred over user plane. If the cumulative event report has been sent previously, this IE contains the number of event reports have transferred over user plane since the last cumulative event report was sent. | |
| indoorOutdoorInd | IndoorOutdoorInd | O | 0..1 | When present, this IE shall indicate whether the UE is indoor or outdoor. | |
| relatedApplicationLayerId | ApplicationlayerId | O | 0..1 | Identifies the application layer ID of the related UE for ranging and sidelink positioning, such as located UE, reference UE, etc. | Ranging_SL |

| | | | | | |
|--------------------|--------------------|---|------|---|------------|
| distanceDirection | RangeDirection | O | 0..1 | When present, this IE identifies a distance and direction from a point A to a point B, comprising a distance from point A to point B, an azimuth direction from point A to point B and an elevation direction from point A to point B. | Ranging_SL |
| 2dRelativeLocation | 2DRelativeLocation | O | 0..1 | When present, this IE identifies a relative 2D location with uncertainty ellipse, characterised by a point described in 2D local co-ordinates with origin corresponding to another known point, distances r1 and r2 and an angle of orientation A. | Ranging_SL |
| 3dRelativeLocation | 3DRelativeLocation | O | 0..1 | When present, this IE identifies a relative 3D location with uncertainty ellipsoid, characterised by a point described in 3D local co-ordinates with origin corresponding to another known point, distances r1 (the "semi-major uncertainty"), r2 (the "semi-minor uncertainty") and r3 (the "vertical uncertainty") and an angle of orientation A (the "angle of the major axis"). | Ranging_SL |
| relativeVelocity | VelocityEstimate | O | 0..1 | When present, this IE identifies UE velocity relative to the UE identified with relatedApplicationlayerId. | Ranging_SL |
| integrityResult | IntegrityResult | C | 0..1 | This IE shall be present when the integrity requirements are present in the request and the integrity result is available. When present, this IE shall indicate the integrity result. | |
| nrppaPeriodicInd | boolean | C | 0..1 | This IE shall be present with the value true in request sent from the (V)GMLC to the (H)GMLC, if the indication was received from the AMF. Presence of this IE with the value false shall be prohibited. | |

6.1.5.2.7 Type: UePrivacyRequirements

Table 6.1.5.2.7-1: Definition of type UePrivacyRequirements

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|----------------|---|-------------|---|---------------|
| lcsServiceAuthInfo | LcsServiceAuth | O | 0..1 | When present, this IE shall contain an indication of privacy related notification or verification for the target UE. The default value of this parameter if not presents is "LOCATION_ALLOWED_WITHOUT_NOTIFICATION". | |
| codeWordCheck | boolean | O | 0..1 | When present, it shall indicate whether the Codeword parameter shall be checked in UE. (NOTE) | |
| NOTE: Checking of the Codeword in UE applies only when the Codeword parameter (specified in clause 6.1.5.2.2) is present and when the codeWordCheck parameter is present and set to TRUE. | | | | | |

6.1.5.2.8 Void

6.1.5.2.9 Type: LocUpdateNotification

Table 6.1.5.2.9-1: Definition of type LocUpdateNotification

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-----------------------------|-----------------------------|---|-------------|---|---------------|
| supi | Supi | O | 0..1 | Subscription Permanent Identifier | |
| gpsi | Gpsi | O | 0..1 | Generic Public Subscription Identifier | |
| locationRequestType | LocationRequestType | M | 1 | Event causing the location estimate (5GC-MO-LR) | |
| locationEstimate | GeographicArea | M | 1 | geographic area of the target UE | |
| ageOfLocationEstimate | AgeOfLocationEstimate | M | 1 | Age of location estimate | |
| timestampOfLocationEstimate | DateTime | O | 0..1 | When present, this IE shall indicate the estimated UTC time when the location estimate corresponded to the UE location (i.e. when the location estimate and the actual UE location was the same). | |
| accuracyFulfilmentIndicator | AccuracyFulfilmentIndicator | M | 1 | The indication whether the obtained location estimate satisfies the requested accuracy or not | |
| civicAddress | CivicAddress | O | 0..1 | Civic address of the target UE | |
| lcsQosClass | LcsQosClass | M | 1 | The LCS QoS Class requested by the target UE | |
| afId | string | O | 0..1 | Identity of the AF | |
| serviceIdentity | ServiceIdentity | O | 0..1 | When present, this IE shall contain Service Identity mapped from the LCS Service Type specified by the UE, as specified in clause 6.2 of 3GPP TS 23.273 [4]. | |

6.1.5.2.10 Type: LocUpdateSubs

Table 6.1.5.2.10-1: Definition of type LocUpdateSubs

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|---------------|---|-------------|--|---------------|
| nfnInstanceid | NfnInstanceid | M | 1 | Identity of the NF Instance creating the subscription. | |
| notifUri | Uri | M | 1 | The URI via which the NF service consumer wants to receive notifications related to this subscription. | |
| supi | Supi | C | 0..1 | SUPI of the UE concerned by the subscription. This attribute shall be present if the gpsi attribute is not present. | |
| gpsi | Gpsi | C | 0..1 | GPSI of the UE concerned by the subscription. This attribute shall be present if the supi attribute is not present. | |

6.1.5.2.11 Type: EventNotifyDataAdditionalInfo

Table 6.1.5.2.11-1: Definition of type EventNotifyDataAdditionalInfo

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------|------------------------|---|-------------|---|---------------|
| addEventDataList | array(EventNotifyData) | O | 1..N | When present, this IE shall include a list of event reports of the additional UE(s) which belong to the target group. | |

6.1.5.2.12 Type: EventNotifyDataExt

Table 6.1.5.2.12-1: Definition of type EventNotifyDataExt as a list of to be combined data

| Data type | Cardinality | Description | Applicability |
|-------------------------------|-------------|---|---------------|
| EventNotifyData | 1 | Event Notification Data | |
| EventNotifyDataAdditionalInfo | 1 | Additional information of the Event Notification Data | |

6.1.5.2.13 Type: AreaEventInfoAddition

Table 6.1.5.2.13-1: Definition of type AreaEventInfoAddition

| Attribute name | Data type | P | Cardinality | Description |
|--------------------|-----------------------|---|-------------|---|
| geoAreaList | array(GeographicArea) | O | 1..N | One or more geographic areas for location reporting event |
| ignoreAreaDefInd | boolean | O | 0..1 | Indicating whether the "areaDefinition" IE in AreaEventInfoExt combined data type shall be ignored or not: - true: the "areaDefinition" IE shall be ignored. - false (default) the "areaDefinition" IE shall not be ignored. |
| additionalCheckInd | boolean | O | 0..1 | This IE shall be included with the value "true" to indicate that additional check whether UE is located within the requested target area is required, as specified in 3GPP TS 23.273 [4] clause 6.3.1. When present, this IE shall be set as following: - true: the additional check whether UE is located within the requested target area is required - false (default): the additional check whether UE is located within the requested target area is not required |

6.1.5.2.14 Type: AreaEventInfoExt

Table 6.1.5.2.14-1: Definition of type AreaEventInfoExt as a list of to be combined data

| Data type | Cardinality | Description | Applicability |
|-----------------------|-------------|--|---------------|
| AreaEventInfo | 1 | Area Event Information | |
| AreaEventInfoAddition | 1 | Addition information for Extended Area Event Information | |

6.1.5.2.15 Type: IntegrityRequirements

Table 6.1.5.2.15-1: Definition of type IntegrityRequirements

| Attribute name | Data type | P | Cardinality | Description |
|---------------------|---------------------|---|-------------|--|
| targetIntegrityRisk | TargetIntegrityRisk | O | 0..1 | This IE shall indicate Target Integrity Risk (TIR), as specified in 3GPP TS 37.355 [23] and 3GPP TS 38.305 [26]. |
| timeToAlert | TimeToAlert | O | 0..1 | This IE shall indicate the Time-to-Alert (TTA) as specified in 3GPP TS 38.305 [26]. |
| alertLimit | AlertLimit | O | 0..1 | This IE shall indicate Alert Limit (AL), as specified in 3GPP TS 37.355 [23] and 3GPP TS 38.305 [26]. |

6.1.5.2.16 Type: AlertLimit

Table 6.1.5.2.16-1: Definition of type AlertLimit

| Attribute name | Data type | P | Cardinality | Description |
|---------------------------|---------------------------|---|-------------|--|
| horizontalProtectionLevel | HorizontalProtectionLevel | M | 1 | This IE shall indicate the Horizontal Protection Level, as specified in 3GPP TS 37.355 [23]. |
| verticalProtectionLevel | VerticalProtectionLevel | O | 0..1 | This IE shall indicate the Vertical Protection Level, as specified in 3GPP TS 37.355 [23]. |

6.1.5.2.17 Type: UpLocRepInfoAf

Table 6.1.5.2.17-1: Definition of type UpLocRepInfoAf

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---------------------|---------------------|---|-------------|---|---------------|
| upLocRepAfInd | boolean | C | 0..1 | This IE shall be included to indicate that the location reporting over user plane is required. When present, this IE shall be set as following: - true: the location reporting over user plane is required. Presence of this IE with false value is prohibited | |
| upLocRepAddrAf | UpLocRepAddrAf | O | 0..1 | Notification target (LCS client or AF) endpoint address for location reporting over user plane. | |
| upCumEvtRptCriteria | UpCumEvtRptCriteria | O | 0..1 | Criteria for sending cumulative event reports over control plane | |

6.1.5.2.18 Type: UpCumEvtRptCriteria

Table 6.1.5.2.18-1: Definition of type UpCumEvtRptCriteria

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---------------------|-----------|---|-------------|---|---------------|
| evtRptTimeCriteria | integer | O | 0..1 | This IE shall contain a timer in seconds to trigger cumulative event report over control plane when location reporting over user plane is ongoing | |
| evtRptCountCriteria | integer | O | 0..1 | This IE shall contain a number to trigger cumulative event report over control plane when location reporting over user plane is ongoing | |

6.1.5.2.19 Type: AddLocationDatas

Table 6.1.5.2.19-1: Definition of type AddLocationDatas

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------|---------------------|---|-------------|------------------------------------|---------------|
| addLocationDatas | array(LocationData) | O | 1..N | Contains one or more LocationData. | |

6.1.5.2.20 Type: LocationDataExt

Table 6.1.5.2.20-1: Definition of type LocationDataExt as a list of data types to be combined

| Data type | Cardinality | Description | Applicability |
|------------------|-------------|--------------------------|---------------|
| LocationData | 1 | Location Data | |
| AddLocationDatas | 1 | Additional Location Data | |

6.1.6.2.21 Type: RelatedUe

Table 6.1.6.2.21-1: Definition of type RelatedUe

| Attribute name | Data type | P | Cardinality | Description |
|----------------|--------------------|---|-------------|---|
| appLayerId | ApplicationlayerId | C | 0..1 | The Application Layer ID of the UE. (NOTE) |
| gpsi | Gpsi | C | 0..1 | The GPSI of the UE. (NOTE) |
| supi | Supi | C | 0..1 | The SUPI of the UE. (NOTE) |
| relatedUeType | RelatedUeType | M | 1 | The type of the related UE for ranging and sidelink positioning, such as located UE, reference UE, etc. |

NOTE: At least one of the appLayerId IE, the gpsi IE and the supi IE shall be present.

6.1.5.2.22 Type: PrivacyCheckIdMappingReqData

Table 6.1.5.2.22-1: Definition of type PrivacyCheckIdMappingReqData

| Attribute name | Data type | P | Cardinality | Description |
|------------------|------------------------------|---|-------------|--|
| gpsiList | array(Gpsi) | C | 1..N | The list of GPSI of the UE(s) . (NOTE) |
| appLayerIds | array(ApplicationlayerId) | C | 1..N | The list of Application Layer Id of the UE(s) . (NOTE) |
| externalClientId | ExternalClientIdentification | O | 0..1 | When present, this IE indicates the identity of the LCS client |
| afId | string | O | 0..1 | When present, this IE indicates the identity of the AF |

NOTE: Either the gpsiList IE or the appLayerIds IE shall be present.

6.1.5.2.23 Type: PrivacyCheckIdMappingRespData

Table 6.1.5.2.23-1: Definition of type PrivacyCheckIdMappingRespData

| Attribute name | Data type | P | Cardinality | Description |
|----------------|---------------------------|---|-------------|--|
| appLayerIds | array(ApplicationlayerId) | C | 1..N | This IE shall be present if the privacy check is successful for at least one of the UEs and the GPSI of the list of UE(s) is included in the request. When present, this IE shall indicate the list of Application Layer Id of the UE(s) with successful privacy check. |
| gpsiList | array(Gpsi) | C | 1..N | This IE shall be present if the privacy check is successful for at least one of the UEs and the list of Application Layer Id of the UE(s) is included in the request. When present, this IE shall indicate the list of GPSI of the UE(s) with successful privacy check. |

6.1.5.2.24 Void

6.1.5.2.25 Void

6.1.5.2.26 Void

6.1.5.2.27 Type: IntegrityProtectionLevel

Table 6.1.5.2.27-1: Definition of type IntegrityProtectionLevel

| Attribute name | Data type | P | Cardinality | Description |
|---------------------------|---------------------------|---|-------------|--|
| horizontalProtectionLevel | HorizontalProtectionLevel | M | 1 | This IE shall indicate the Horizontal Protection Level, as specified in 3GPP TS 37.355 [23]. |
| verticalProtectionLevel | VerticalProtectionLevel | O | 0..1 | This IE shall indicate the Vertical Protection Level, as specified in 3GPP TS 37.355 [23]. |

6.1.5.2.28 Type: IntegrityResult

Table 6.1.5.2.28-1: Definition of type IntegrityResult

| Attribute name | Data type | P | Cardinality | Description |
|--|--------------------------|---|-------------|---|
| computingEntity | IntegrityComputingEntity | O | 0..1 | When present, this IE shall indicate the entity(ies) who calculated (and determined) the integrity result. |
| protectionLevel | IntegrityProtectionLevel | C | 0..1 | When present, this IE shall indicate the calculated PL, based on the measurement, assistance information and TIR. (NOTE) |
| integrityReqMetInd | boolean | C | 0..1 | When present, this IE shall indicate whether the integrity requirements in the request are met or not: <ul style="list-style-type: none"> - true: the integrity requirements were met. - false: the integrity requirements were not met. (NOTE) |
| achievedTir | TargetIntegrityRisk | O | 0..1 | The IE may be present when the integrityReqMetInd IE is present with the value false. When present, this IE shall indicate the achieved Target Integrity Risk (TIR). |
| NOTE: Either the "protectionLevel" IE or the "integrityReqMetInd" IE shall be present. | | | | |

6.1.5.2.29 Type: UpLocRepAddrAf

Table 6.1.5.2.29-1: Definition of type UpLocRepAddrAf

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--|-----------------|---|-------------|--|---------------|
| ipv4Addr | array(Ipv4Addr) | C | 1..N | IPv4 address(es) of the Application Function for location reporting over user plane. | |
| ipv6Addr | array(Ipv6Addr) | C | 1..N | IPv6 address(es) of the Application Function for location reporting over user plane. | |
| fqdn | Fqdn | C | 0..1 | FQDN of the Application Function for location reporting over user plane. | |
| NOTE: At least one of these attributes shall be present. | | | | | |

6.1.5.3 Simple data types and enumerations

6.1.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.1.5.3.2 Simple data types

The simple data types defined in table 6.1.5.3.2-1 shall be supported.

Table 6.1.5.3.2-1: Simple data types

| Type Name | Type Definition | Description | Applicability |
|---------------------------------|-----------------|--|---------------|
| ServiceIdentity | string | Service identity | |
| ExternalClientIdentification | string | External LCS client identification | |
| CodeWord | string | codeword | |
| E164CountryCodeOfGeographicArea | string | The combination of one, two or three digits identifying a specific country, countries in an integrated numbering plan, or a specific geographic area | |
| LcsServiceTypeIcd | integer | LCS Service Type Id, as specified clause 7.6.11.15 of 3GPP TS 29.002 [21]. Minimum = 0. Maximum = 127 | |
| TimeToAlert | integer | Time-to-Alert Minimum = 1. Maximum = 300 | |
| TargetIntegrityRisk | integer | Target Integrity Risk Minimum = 10. Maximum = 90 | |
| HorizontalProtectionLevel | integer | Horizontal Protection Level Minimum = 0. Maximum = 50000 | |
| VerticalProtectionLevel | integer | Vertical Protection Level Minimum = 0. Maximum = 50000 | |

6.1.5.3.3 Enumeration: PseudonymIndicator

The enumeration PseudonymIndicator represents whether pseudonym should be used as the identity of the target UE. It shall comply with the provisions defined in table 6.1.5.3.3-1.

Table 6.1.5.3.3-1: Enumeration PseudonymIndicator

| Enumeration value | Description | Applicability |
|---------------------------|------------------------------|---------------|
| "PSEUDONYM_REQUESTED" | A pseudonym is requested | |
| "PSEUDONYM_NOT_REQUESTED" | A pseudonym is not requested | |

6.1.5.3.4 Enumeration: LocationRequestType

The enumeration LocationRequestType represents how the location request is triggered. It shall comply with the provisions defined in table 6.1.5.3.4-1.

Table 6.1.5.3.4-1: Enumeration LocationRequestType

| Enumeration value | Description | Applicability |
|-------------------|------------------------------------|---------------|
| "NI-LR" | Network induced location request | |
| "MT-LR" | Mobile terminated location request | |
| "MO-LR" | Mobile originated location request | |

NOTE: Some of the values in the enumeration deviate from the naming conventions indicated in clause 5.1.4 of 3GPP TS 29.501 [6] (i.e. to use UPPER_WITH_UNDERSCORE); however, it is kept as currently defined in this specification to maintain backwards compatibility

6.1.5.3.5 Enumeration: LocationTypeRequested

The enumeration LocationTypeRequested represents the requested type of location which is only applicable to location immediate request. It shall comply with the provisions defined in table 6.1.5.3.5-1.

Table 6.1.5.3.5-1: Enumeration LocationTypeRequested

| Enumeration value | Description | Applicability |
|----------------------------------|--|---------------|
| "CURRENT_LOCATION" | Requesting the current location of the target UE | |
| "CURRENT_OR_LAST_KNOWN_LOCATION" | Requesting the current or last known location of the target UE | |
| "INITIAL_LOCATION" | Requesting the initial location of the target UE | |
| "NOTIFICATION_VERIFICATION_ONLY" | Requesting notification verification only | |

6.1.5.3.6 Enumeration: EventNotifyDataType

The enumeration EventNotifyDataType represents the type of event notification. It shall comply with the provisions defined in table 6.1.5.3.6-1.

Table 6.1.5.3.6-1: Enumeration EventNotifyDataType

| Enumeration value | Description | Applicability |
|-------------------------------------|---|---------------|
| "UE_AVAILABLE" | UE available event | |
| "PERIODIC" | Periodic event | |
| "ENTERING_INTO_AREA" | Entering area event | |
| "LEAVING_FROM_AREA" | Leaving area event | |
| "BEING_INSIDE_AREA" | Being inside area event | |
| "MOTION" | Motion event | |
| "MAXIMUM_INTERVAL_EXPIRATION_EVENT" | Expiration of maximum reporting interval event | |
| "LOCATION_CANCELLATION_EVENT" | Cancellation of location reporting event | |
| "ACTIVATION_OF_DEFERRED_LOCATION" | A confirmation that periodic or triggered location was successfully activated in the target UE | |
| "UE_MOBILITY_FOR_DEFERRED_LOCATION" | Mobility of the target UE to a different NF | |
| "5GC_MT_LR" | Report of immediate 5GC mobile terminated location. It is used for 5GC_MT_LR request targeting to a group of UE procedure. | |
| "DIRECT_REPORT_EVENT" | Direct location reporting event | |
| "CUMULATIVE_EVENT_REPORT" | Cumulative event report for events reported | |

6.1.5.3.7 Enumeration: FailureCause

The enumeration FailureCause represents the cause of positioning failure. It shall comply with the provisions defined in table 6.1.5.3.7-1.

Table 6.1.5.3.7-1: Enumeration FailureCause

| Enumeration value | Description | Applicability |
|----------------------|------------------------------------|---------------|
| "POSITIONING_DENIED" | Positioning is denied | |
| "UNSUPPORTED_BY_UE" | Positioning is not supported by UE | |
| "NOT_REGISTERED_UE" | UE doesn't register | |
| "UNSPECIFIED" | Unspecified | |

6.1.5.3.8 Enumeration: SuccessType

The enumeration SuccessType represents the type of success. It shall comply with the provisions defined in table 6.1.5.3.8-1.

Table 6.1.5.3.8-1: Enumeration SuccessType

| Enumeration value | Description | Applicability |
|----------------------|------------------------------|---------------|
| "SUCCESS_COMPLETELY" | It is completely successful. | |
| "SUCCESS_PARTIALLY" | It is partially successful. | |

6.1.5.3.9 Enumeration: ReportingInd

The enumeration ReportingInd represents whether the UE is allowed to generate and send the event report when the UE detects the triggered or periodic event happens, if it is inside or outside the event report allowed/expected area. It shall comply with the provisions defined in table 6.1.5.3.9-1.

Table 6.1.5.3.9-1: Enumeration ReportingInd

| Enumeration value | Description | Applicability |
|---------------------|---|---------------|
| "INSIDE_REPORTING" | The UE is allowed to generate and send the event report when the UE is inside the event report allowed/expected area. | |
| "OUTSIDE_REPORTING" | The UE is allowed to generate and send the event report when the UE is outside the event report allowed/expected area | |

6.1.5.3.10 Enumeration: IntegrityComputingEntity

The enumeration IntegrityComputingEntity represents the entity who calculated (and determined) the integrity result. It shall comply with the provisions defined in table 6.1.5.3.10-1.

Table 6.1.5.3.10-1: Enumeration IntegrityComputingEntity

| Enumeration value | Description |
|-------------------|---|
| "UE" | Indicates that the Integrity result was calculated (and determined) by the UE. |
| "LMF" | Indicates that the Integrity result was calculated (and determined) by the LMF. |
| "BOTH" | Indicates that the Integrity result was calculated (and determined) by both the UE and the LMF. |

6.1.6 Error Handling

6.1.6.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [5].

6.1.6.2 Protocol Errors

Protocol errors handling shall be supported as specified in clause 5.2.7 of 3GPP TS 29.500 [5].

6.1.6.3 Application Errors

The common application errors defined in Table 5.2.7.2-1 in 3GPP TS 29.500 [5] may be used for the Ngmlc_Location. The application errors defined for the Ngmlc_Location service are listed in Table 6.1.6.3-1.

Table 6.1.6.3-1: Application errors

| Application Error | HTTP status code | Description |
|-----------------------------------|---------------------------|--|
| POSITIONING_DENIED | 403 Forbidden | the positioning procedure was denied. |
| UNSPECIFIED | 403 Forbidden | the request is rejected due to unspecified reasons. |
| UNSUPPORTED_BY_UE | 403 Forbidden | the position request for periodic or triggered location is not supported by the target UE |
| LOCATION_SESSION_UNKNOWN | 403 Forbidden | the location context was not found |
| UNREQUESTED_BY_UE | 403 Forbidden | the UE did not request transfer of its location to an LCS Client or AF |
| UNKOWN_EXTERNAL_CLIENT_OR_AF | 403 Forbidden | the external LCS client or AF is unknown |
| UNREACHABLE_EXTERNAL_CLIENT_OR_AF | 403 Forbidden | the external LCS client or AF is unreachable |
| DETACHED_USER | 403 Forbidden | the user is deregistered in the AMF |
| ID_MAPPING_NOT_AVAILABLE | 403 Forbidden | The ID Mapping information is not available for the UE identifier. |
| RANGING_SL_POS_NOT_ALLOWED | 403 Forbidden | Ranging SL Positioning Service not allowed by the UE or the Ranging SL Positioning Service for the UE to not allowed to be exposed to the SL Positioning Client UE |
| UNKNOWN_UE_IDENTIFIER | 403 Forbidden | The UE Identifier is unknown |
| MAX_TARGET_UE_NUM_EXCEED | 403 Forbidden | the request is rejected because the maximum allowed number of targeting UEs by the LCS client is exceeded. |
| POSITIONING_FAILED | 500 Internal Server Error | the positioning procedure failed |
| UNSUPPORTED_EVENT_TYPE | 501 Not Implemented | The request for creation of a subscription is rejected because none of the events is supported by the GMLC. |
| UNREACHABLE_USER | 504 Gateway Timeout | the user could not be reached in order to perform positioning procedure |
| PEER_NOT_RESPONDING | 504 Gateway Timeout | No response is received from a remote peer, i.e., 1) The response from the serving AMF wasn't received by (V)GMLC, or; 2) (V)GMLC received HTTP status code 504 with PEER_NOT_RESPONDING from AMF. |

6.1.7 Feature negotiation

The optional features in table 6.1.7-1 are defined for the Ngmlc_Location API.

Table 6.1.7-1: Supported Features

| Feature number | Feature Name | Description |
|----------------|--------------|--|
| 1 | MUTIQOS | Support of Multiple Location QoSes. This feature bit indicates the support of more than one Location QoSes during consuming location service. |
| 2 | Ranging_SL | Support of Ranging and Sidelink Positioning This feature indicates the support of Ranging and Sidelink Positioning. |
| 3 | MBSR | Support of Mobile Base Station Relay. This feature indicates the support of location service capability for MBSR. |
| 4 | MWAB | Support of Mobile gNB with Wireless Access Backhauling. This feature indicates the support of location service capability for MWAB. |

6.1.8 Security

As indicated in 3GPP TS 33.501 [15], the access to the Ngmlc_Location API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [16]), using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [17]) plays the role of the authorization server.

If OAuth2 authorization is used, an NF Service Consumer, prior to consuming services offered by the Ngmlc_Location API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [17], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Ngmlc_Location service.

The Ngmlc_Location API defines the following scopes for OAuth2 authorization as specified in 3GPP TS 33.501 [15]:

Table 6.1.8-1: OAuth2 scopes defined in Ngmlc_Location API

| Scope | Description |
|---|--|
| "ngmlc-loc" | Access to the Ngmlc_Location API. |
| "ngmlc-loc:provide-location:invoke" | Access to invoke Provide Location |
| "ngmlc-loc:cancel-location:invoke" | Access to invoke Cancel Location |
| "ngmlc-loc:location-update:invoke" | Access to invoke Location update |
| "ngmlc-loc:loc-update-subs:invoke" | Access to invoke Location update subscribe |
| "ngmlc-loc:perform-privacy-check-id-mapping:invoke" | Access to invoke Privacy Check Id Mapping |

6.1.9 HTTP redirection

An HTTP request may be redirected to a different GMLC service instance, within the same GMLC or a different GMLC of an GMLC set, e.g. when an GMLC service instance is part of an GMLC (service) set or when using indirect communications (see 3GPP TS 29.500 [5]).

An SCP that reselects a different GMLC producer instance will return the NF Instance ID of the new GMLC producer instance in the 3gpp-Sbi-Producer-Id header, as specified in clause 6.10.3.4 of 3GPP TS 29.500 [5].

If an GMLC within an GMLC set redirects a service request to a different GMLC of the set using an 307 Temporary Redirect or 308 Permanent Redirect status code, the identity of the new GMLC towards which the service request is redirected shall be indicated in the 3gpp-Sbi-Target-Nf-Id header of the 307 Temporary Redirect or 308 Permanent Redirect response as specified in clause 6.10.9.1 of 3GPP TS 29.500 [5].

Annex A (normative): OpenAPI specification

A.1 General

This Annex specifies the formal definition of the Ngmlc_Location service. It consists of OpenAPI 3.0.0 specifications, in YAML format.

This Annex takes precedence when being discrepant to other parts of the specification with respect to the encoding of information elements and methods within the API(s).

NOTE: The semantics and procedures, as well as conditions, e.g. for the applicability and allowed combinations of attributes or values, not expressed in the OpenAPI definitions but defined in other parts of the specification also apply.

Informative copies of the OpenAPI specification files contained in this 3GPP Technical Specification are available on a Git-based repository, that uses the GitLab software version control system (see 3GPP TS 29.501 [6] clause 5.3.1 and 3GPP TR 21.900 [19] clause 5B).

A.2 Ngmlc_Location API

```
openapi: 3.0.0
info:
  version: '1.3.0'
  title: 'Ngmlc_Location'
  description: |
    GMLC Location Service.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 29.515 V19.5.0; 5G System; Gateway Mobile Location Services; Stage 3
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.515/'

servers:
  - url: '{apiRoot}/ngmlc-loc/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501

security:
  - {}
  - oAuth2ClientCredentials:
    - ngmlc-loc

paths:
  /provide-location:
    post:
      summary: Request Location of an UE
      operationId: RequestLocation
      tags:
        - Request Location
      security:
        - {}
        - oAuth2ClientCredentials:
          - ngmlc-loc
        - oAuth2ClientCredentials:
          - ngmlc-loc
        - ngmlc-loc:provide-location:invoke
      requestBody:
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/InputData'
            required: true
      responses:
```

```

'200':
  description: Expected response to a valid request
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/LocationDataExt'
'307':
  $ref: 'TS29571_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29571_CommonData.yaml#/components/responses/308'
'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'
'501':
  $ref: 'TS29571_CommonData.yaml#/components/responses/501'
'500':
  $ref: 'TS29571_CommonData.yaml#/components/responses/500'
'502':
  $ref: 'TS29571_CommonData.yaml#/components/responses/502'
'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/EventNotifyDataExt'
        responses:
          '204':
            description: Expected response to a valid notification
          '307':
            $ref: 'TS29571_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29571_CommonData.yaml#/components/responses/308'
          '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'
          '502':
            $ref: 'TS29571_CommonData.yaml#/components/responses/502'
          '503':
            $ref: 'TS29571_CommonData.yaml#/components/responses/503'
          '504':
            $ref: 'TS29571_CommonData.yaml#/components/responses/504'

```

```

    $ref: 'TS29571_CommonData.yaml#/components/responses/504'
  default:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'
EventNotifyNf:
  '{$request.body#/eventNotificationUri}':
    post:
      requestBody:
        description: UE Event Notification
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EventNotifyDataExt'
      responses:
        '204':
          description: Expected response to a valid notification
        '307':
          $ref: 'TS29571_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29571_CommonData.yaml#/components/responses/308'
        '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'
        '502':
          $ref: 'TS29571_CommonData.yaml#/components/responses/502'
        '503':
          $ref: 'TS29571_CommonData.yaml#/components/responses/503'
        '504':
          $ref: 'TS29571_CommonData.yaml#/components/responses/504'
        default:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'
/cancel-location:
  post:
    summary: request cancellation of periodic or triggered location
    operationId: CancelLocation
    tags:
      - Cancel Location
    security:
      - {}
      - oAuth2ClientCredentials:
          - ngmlc-loc
      - oAuth2ClientCredentials:
          - ngmlc-loc
      - ngmlc-loc:cancel-location:invoke
    requestBody:
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/CancelLocData'
      required: true
    responses:
      '204':
        description: Expected response to a successful cancellation
      '307':
        $ref: 'TS29571_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29571_CommonData.yaml#/components/responses/308'
      '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'
  '502':
    $ref: 'TS29571_CommonData.yaml#/components/responses/502'
  '503':
    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
  '504':
    $ref: 'TS29571_CommonData.yaml#/components/responses/504'
  default:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'
/location-update:
  post:
    summary: update UE location information
    operationId: UpdateLocation
    tags:
      - Update Location
    security:
      - {}
      - oAuth2ClientCredentials:
          - ngmlc-loc
      - oAuth2ClientCredentials:
          - ngmlc-loc
          - ngmlc-loc:location-update:invoke
    requestBody:
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/LocUpdateData'
      required: true
    responses:
      '204':
        description: Expected response to successful location context transfer
      '307':
        $ref: 'TS29571_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29571_CommonData.yaml#/components/responses/308'
      '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'
      '502':
        $ref: 'TS29571_CommonData.yaml#/components/responses/502'
      '503':
        $ref: 'TS29571_CommonData.yaml#/components/responses/503'
      '504':
        $ref: 'TS29571_CommonData.yaml#/components/responses/504'
      default:
        $ref: 'TS29571_CommonData.yaml#/components/responses/default'
/loc-update-subscribe:
  post:
    summary: subscribe to notifications of UE location information
    operationId: LocationUpdateSubscribe
    tags:
      - UE location information Subscription creation
    security:

```

```

- {}
- oAuth2ClientCredentials:
- ngmlc-loc
- oAuth2ClientCredentials:
- ngmlc-loc
- ngmlc-loc:loc-update Subs:invoke
requestBody:
content:
application/json:
schema:
$ref: '#/components/schemas/LocUpdateSubs'
required: true
responses:
'204':
description: Expected response to successful UE location information subscription
'307':
$ref: 'TS29571_CommonData.yaml#/components/responses/307'
'308':
$ref: 'TS29571_CommonData.yaml#/components/responses/308'
'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'
'502':
$ref: 'TS29571_CommonData.yaml#/components/responses/502'
'503':
$ref: 'TS29571_CommonData.yaml#/components/responses/503'
'504':
$ref: 'TS29571_CommonData.yaml#/components/responses/504'
default:
$ref: 'TS29571_CommonData.yaml#/components/responses/default'
callbacks:
LocationUpdateNotify:
'{$request.body#/notifUri}':
post:
requestBody:
description: Location Update Notification
content:
application/json:
schema:
$ref: '#/components/schemas/LocUpdateNotification'
responses:
'204':
description: Expected response to a valid notification
'307':
$ref: 'TS29571_CommonData.yaml#/components/responses/307'
'308':
$ref: 'TS29571_CommonData.yaml#/components/responses/308'
'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'
    '502':
      $ref: 'TS29571_CommonData.yaml#/components/responses/502'
    '503':
      $ref: 'TS29571_CommonData.yaml#/components/responses/503'
    '504':
      $ref: 'TS29571_CommonData.yaml#/components/responses/504'
    default:
      $ref: 'TS29571_CommonData.yaml#/components/responses/default'
/perform-privacy-check-id-mapping:
  post:
    summary: Privacy Check Id Mapping for Ranging SL Positioning Service
    operationId: PrivacyCheckIdMapping
    tags:
      - Privacy Check Id Mapping
    security:
      - {}
      - oAuth2ClientCredentials:
          - ngmlc-loc
      - oAuth2ClientCredentials:
          - ngmlc-loc
          - ngmlc-loc:perform-privacy-check-id-mapping:invoke
    requestBody:
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/PrivacyCheckIdMappingReqData'
      required: true
    responses:
      '200':
        description: Successful result for Privacy Check Id Mapping
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/PrivacyCheckIdMappingRespData'
      '307':
        $ref: 'TS29571_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29571_CommonData.yaml#/components/responses/308'
      '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'
      '502':
        $ref: 'TS29571_CommonData.yaml#/components/responses/502'
      '503':
        $ref: 'TS29571_CommonData.yaml#/components/responses/503'
      '504':
        $ref: 'TS29571_CommonData.yaml#/components/responses/504'
    default:
      $ref: 'TS29571_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            ngmlc-loc: Access to the Ngmlc_Location API
            ngmlc-loc:provide-location:invoke: Access to invoke Provide Location
            ngmlc-loc:cancel-location:invoke: Access to invoke Cancel Location

```

ngmlc-loc:location-update:invoke: Access to invoke Location update
 ngmlc-loc:loc-update-subs:invoke: Access to invoke Location update subscribe
 ngmlc-loc:perform-privacy-check-id-mapping:invoke: Access to invoke Privacy Check Id

Mapping

```

schemas:
#
# COMPLEX TYPES
#
  InputData:
    description: Contains the input parameters in ProvideLocation service operation
    type: object
    required:
      - externalClientType
    properties:
      gpsi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      supi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
      appLayerId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ApplicationlayerId'
      extGroupId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ExternalGroupId'
      intGroupId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/GroupId'
      externalClientType:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/ExternalClientType'
      locationQoS:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LocationQoS'
      supportedGADShapes:
        type: array
        items:
          $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/SupportedGADShapes'
        minItems: 1
      serviceIdentity:
        $ref: '#/components/schemas/ServiceIdentity'
      serviceCoverage:
        type: array
        items:
          $ref: '#/components/schemas/E164CountryCodeOfGeographicArea'
        minItems: 1
      ldrType:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LdrType'
      periodicEventInfo:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/PeriodicEventInfo'
      areaEventInfo:
        $ref: '#/components/schemas/AreaEventInfoExt'
      motionEventInfo:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/MotionEventInfo'
      ldrReference:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LdrReference'
      hgmlcCallbackUri:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      eventNotificationUri:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      externalClientIdentification:
        $ref: '#/components/schemas/ExternalClientIdentification'
      afId:
        type: string
      uePrivacyRequirements:
        $ref: '#/components/schemas/UePrivacyRequirements'
      lcsServiceType:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LcsServiceType'
      velocityRequested:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/VelocityRequested'
      priority:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LcsPriority'
      locationTypeRequested:
        $ref: '#/components/schemas/LocationTypeRequested'
      maximumAgeOfLocationEstimate:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/AgeOfLocationEstimate'
      amfId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/AmfId'
      codeWord:
        $ref: '#/components/schemas/CodeWord'
      scheduledLocTime:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'

```

```

reliableLocReq:
  type: boolean
  default: false
servingLmfId:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LMFIdentification'
lpHapType:
  $ref: 'TS29518_Namf_Location.yaml#/components/schemas/LpHapType'
evtRptExpectedArea:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
reportingInd:
  allOf:
    - $ref: '#/components/schemas/ReportingInd'
  default: INSIDE_REPORTING
integrityRequirements:
  $ref: '#/components/schemas/IntegrityRequirements'
upLocRepInfoAf:
  $ref: '#/components/schemas/UpLocRepInfoAf'
requestedRangingSlResult:
  type: array
  items:
    $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/RangingSlResult'
  minItems: 1
relatedUes:
  type: array
  items:
    $ref: '#/components/schemas/RelatedUe'
  minItems: 1
mappedQoSeps:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/MappedLocationQoSeps'
coordinateID:
  type: integer
mbsrPosInd:
  type: boolean
  enum:
    - true
mwabInd:
  type: boolean
  enum:
    - true

```

```

LocationDataExt:
  description: Extended Location Data for UEs
  allOf:
    - $ref: '#/components/schemas/LocationData'
    - $ref: '#/components/schemas/AddLocationDatas'

```

```

LocationData:
  description: Contains the response parameters in ProvideLocation service operation
  type: object
  properties:
    gpsi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    supi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
    locationEstimate:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
    civicAddress:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/CivicAddress'
    localLocationEstimate:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LocalArea'
    ageOfLocationEstimate:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/AgeOfLocationEstimate'
    timestampOfLocationEstimate:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    positioningDataList:
      type: array
      items:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/PositioningMethodAndUsage'
      minItems: 1
    gnssPositioningDataList:
      type: array
      items:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GnssPositioningMethodAndUsage'
      minItems: 1
    accuracyFulfilmentIndicator:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/AccuracyFulfilmentIndicator'

```

```

ueVelocity:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/VelocityEstimate'
ldrReference:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LdrReference'
altitude:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/Altitude'
servingLMFIdentification:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LMFIdentification'
locationPrivacyVerResult:
  $ref: 'TS29518_Namf_Location.yaml#/components/schemas/LocationPrivacyVerResult'
successType:
  $ref: '#/components/schemas/SuccessType'
achievedQos:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/MinorLocationQoS'
directReportInd:
  type: boolean
  default: false
acceptedPeriodicEventInfo:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/PeriodicEventInfo'
haGnssMetrics:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/HighAccuracyGnssMetrics'
losNlosMeasureInd:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LosNlosMeasureInd'
indoorOutdoorInd:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/IndoorOutdoorInd'
relatedApplicationlayerId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/ApplicationlayerId'
distanceDirection:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/RangeDirection'
2dRelativeLocation:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/2DRelativeLocation'
3dRelativeLocation:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/3DRelativeLocation'
relativeVelocity:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/VelocityEstimate'
integrityResult:
  $ref: '#/components/schemas/IntegrityResult'

CancelLocData:
  description: Contains the input parameters in CancelLocation service operation
  type: object
  required:
    - hgmlcCallBackUri
    - ldrReference
  properties:
    gpsi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    supi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
    extGroupId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ExternalGroupId'
    intGroupId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/GroupId'
    hgmlcCallBackUri:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    ldrReference:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LdrReference'
    lmfIdentification:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LMFIdentification'
    amfId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/AmfId'
    nrppaPeriodicInd:
      type: boolean
      enum:
        - true

LocUpdateData:
  description: Contains the input parameters in LocationUpdate service operation
  type: object
  required:
    - locationRequestType
    - locationEstimate
    - ageOfLocationEstimate
    - accuracyFulfilmentIndicator
    - lcsQosClass
  properties:
    gpsi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'

```

```

supi:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
pseudonymIndicator:
  $ref: '#/components/schemas/PseudonymIndicator'
locationRequestType:
  $ref: '#/components/schemas/LocationRequestType'
locationEstimate:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
ageOfLocationEstimate:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/AgeOfLocationEstimate'
timestampOfLocationEstimate:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
accuracyFulfilmentIndicator:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/AccuracyFulfilmentIndicator'
civicAddress:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/CivicAddress'
lcsQosClass:
  $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LcsQosClass'
externalClientIdentification:
  $ref: '#/components/schemas/ExternalClientIdentification'
afId:
  type: string
gmlcNumber:
  type: string
  pattern: '^([0-9]){5,15}$'
lcsServiceType:
  $ref: '#/components/schemas/LcsServiceTypeId'

EventNotifyData:
  description: >
    Contains the input parameters for the target UE in EventNotify Notification
    service operation
  type: object
  required:
    - eventNotifyDataType
    - ldrReference
  properties:
    gpsi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    supi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
    ldrReference:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LdrReference'
    eventNotifyDataType:
      $ref: '#/components/schemas/EventNotifyDataType'
    locationEstimate:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
    civicAddress:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/CivicAddress'
    localLocationEstimate:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LocalArea'
    ageOfLocationEstimate:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/AgeOfLocationEstimate'
    timestampOfLocationEstimate:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    positioningDataList:
      type: array
      items:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/PositioningMethodAndUsage'
      minItems: 1
    gnssPositioningDataList:
      type: array
      items:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GnssPositioningMethodAndUsage'
      minItems: 1
    lmfIdentification:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LMFIdentification'
    amfId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/AmfId'
    terminationCause:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/TerminationCause'
    velocityEstimate:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/VelocityEstimate'
    altitude:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/Altitude'
    targetNode:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    accuracyFulfilmentIndicator:

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```

    $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/AccuracyFulfilmentIndicator'
  failureCause:
    $ref: '#/components/schemas/FailureCause'
  achievedQos:
    $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/MinorLocationQoS'
  haGnssMetrics:
    $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/HighAccuracyGnssMetrics'
  losNlosMeasureInd:
    $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LosNlosMeasureInd'
  upLocRepStatAf:
    type: integer
  indoorOutdoorInd:
    $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/IndoorOutdoorInd'
  relatedApplicationlayerId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/ApplicationlayerId'
  distanceDirection:
    $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/RangeDirection'
  2dRelativeLocation:
    $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/2DRelativeLocation'
  3dRelativeLocation:
    $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/3DRelativeLocation'
  relativeVelocity:
    $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/VelocityEstimate'
  integrityResult:
    $ref: '#/components/schemas/IntegrityResult'
  nrppaPeriodicInd:
    type: boolean
    enum:
      - true

UePrivacyRequirements:
  description: >
    UE privacy requirements from (H)GMLC to the serving AMF or VGMLC(in the roaming case)
    for the target UE
  type: object
  properties:
    lcsServiceAuthInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/LcsServiceAuth'
    codeWordCheck:
      type: boolean

LocUpdateNotification:
  description: Location Update Notification
  type: object
  required:
    - locationRequestType
    - locationEstimate
    - ageOfLocationEstimate
    - accuracyFulfilmentIndicator
    - lcsQosClass
  properties:
    gpsi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    supi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
    locationRequestType:
      $ref: '#/components/schemas/LocationRequestType'
    locationEstimate:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
    ageOfLocationEstimate:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/AgeOfLocationEstimate'
    timestampOfLocationEstimate:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    accuracyFulfilmentIndicator:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/AccuracyFulfilmentIndicator'
    civicAddress:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/CivicAddress'
    lcsQosClass:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LcsQosClass'
    afId:
      type: string
    serviceIdentity:
      $ref: '#/components/schemas/ServiceIdentity'

LocUpdateSubs:
  description: UE location information subscription
  type: object
  required:

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```

    - nfInstanceId
    - notifURI
  properties:
    nfInstanceId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    notifURI:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    gpsi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    supi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'

EventNotifyDataExt:
  description: Extended Event Notify Data for UEs of a target group
  allOf:
    - $ref: '#/components/schemas/EventNotifyData'
    - $ref: '#/components/schemas/EventNotifyDataAdditionalInfo'

EventNotifyDataAdditionalInfo:
  description: Additional information to Event Notify Data
  type: object
  properties:
    addEventDataList:
      type: array
      items:
        $ref: '#/components/schemas/EventNotifyData'
      minItems: 1

AreaEventInfoAddition:
  description: Additional information for Extended Area event information
  type: object
  properties:
    geoAreaList:
      type: array
      items:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
      minItems: 1
    ignoreAreaDefInd:
      type: boolean
      default: false
    additionalCheckInd:
      type: boolean
      default: false

AreaEventInfoExt:
  description: Extended Area Event Information
  allOf:
    - $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/AreaEventInfo'
    - $ref: '#/components/schemas/AreaEventInfoAddition'

IntegrityRequirements:
  description: integrity requirements.
  type: object
  properties:
    timeToAlert:
      $ref: '#/components/schemas/TimeToAlert'
    targetIntegrityRisk:
      $ref: '#/components/schemas/TargetIntegrityRisk'
    alertLimit:
      $ref: '#/components/schemas/AlertLimit'

AlertLimit:
  description: Alert Limit.
  type: object
  required:
    - horizontalProtectionLevel
  properties:
    horizontalProtectionLevel:
      $ref: '#/components/schemas/HorizontalProtectionLevel'
    verticalProtectionLevel:
      $ref: '#/components/schemas/VerticalProtectionLevel'

UpLocRepInfoAf:
  description: Information for the location reporting over user plane
  type: object
  properties:
    upLocRepAfInd:
      type: boolean
      enum:

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```

    - true
    upLocRepAddrAf:
      $ref: '#/components/schemas/UpLocRepAddrAf'
    upCumEvtRptCriteria:
      $ref: '#/components/schemas/UpCumEvtRptCriteria'

UpCumEvtRptCriteria:
  description: Criteria for sending cumulative events reports over control plane
  type: object
  properties:
    evtRptTimeCriteria:
      type: integer
    evtRptCountCriteria:
      type: integer

RelatedUe:
  description: Related UE Information
  type: object
  required:
    - relatedUeType
  properties:
    appLayerId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ApplicationlayerId'
    gpsi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    supi:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
    relatedUeType:
      $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/RelatedUeType'

PrivacyCheckIdMappingReqData:
  description: Privacy Check Id Mapping Request Data
  type: object
  properties:
    gpsiList:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      minItems: 1
    appLayerIds:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ApplicationlayerId'
      minItems: 1
    externalClientId:
      $ref: '#/components/schemas/ExternalClientIdentification'
    afd:
      type: string

PrivacyCheckIdMappingRespData:
  description: Privacy Check Id Mapping Response Data
  type: object
  properties:
    appLayerIds:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ApplicationlayerId'
      minItems: 1
    gpsiList:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      minItems: 1

IntegrityProtectionLevel:
  description: Integrity Protection Level.
  type: object
  required:
    - horizontalProtectionLevel
  properties:
    horizontalProtectionLevel:
      $ref: '#/components/schemas/HorizontalProtectionLevel'
    verticalProtectionLevel:
      $ref: '#/components/schemas/VerticalProtectionLevel'

IntegrityResult:
  description: Integrity Result.
  type: object

```

```

properties:
  computingEntity:
    $ref: '#/components/schemas/IntegrityComputingEntity'
  protectionLevel:
    $ref: '#/components/schemas/IntegrityProtectionLevel'
  integrityReqMetInd:
    type: boolean
  achievedTir:
    $ref: '#/components/schemas/TargetIntegrityRisk'

UpLocRepAddrAf:
  description: Represents the user plane addressing information.
  type: object
  properties:
    ipv4Addrs:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
      minItems: 1
    ipv6Addrs:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
      minItems: 1
    fqdn:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Fqdn'
  anyOf:
    - required: [ ipv4Addrs ]
    - required: [ ipv6Addrs ]
    - required: [ fqdn ]

AddLocationDatas:
  description: Contains one or more LocationData
  type: array
  items:
    $ref: '#/components/schemas/LocationData'
  minItems: 1

#
# SIMPLE TYPES
#
ServiceIdentity:
  description: Contains the service identity
  type: string
ExternalClientIdentification:
  description: Contains the external client identification
  type: string
CodeWord:
  description: Contains the codeword
  type: string
E164CountryCodeOfGeographicArea:
  description: Contains the E.164 country codes for geographic areas
  type: string
LcsServiceTypeId:
  description: LCS Service Type Id.
  type: integer
  minimum: 0
  maximum: 127
TimeToAlert:
  description: Contains the time-to-alert
  type: integer
  minimum: 1
  maximum: 300
TargetIntegrityRisk:
  description: Contains the target integrity risk
  type: integer
  minimum: 10
  maximum: 90
HorizontalProtectionLevel:
  description: Contains the Horizontal Protection Level
  type: integer
  minimum: 0
  maximum: 50000
VerticalProtectionLevel:
  description: Contains the Vertical Protection Level
  type: integer
  minimum: 0
  maximum: 50000

```

```

#
# ENUMS
#
PseudonymIndicator:
  anyOf:
    - type: string
      enum:
        - PSEUDONYM_REQUESTED
        - PSEUDONYM_NOT_REQUESTED
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
  description: |
    It defines if a pseudonym is requested.
    Possible values are:
    - PSEUDONYM_REQUESTED: Pseudonym is requested.
    - PSEUDONYM_NOT_REQUESTED: Pseudonym is not requested.

LocationRequestType:
  anyOf:
    - type: string
      enum:
        - NI_LR
        - MT_LR
        - MO_LR
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
  description: |
    It indicates the location request type.
    Possible values are:
    - NI_LR: Network induced location request.
    - MT_LR: Mobile terminated location request.
    - MO_LR: Mobile originated location request.

LocationTypeRequested:
  anyOf:
    - type: string
      enum:
        - CURRENT_LOCATION
        - CURRENT_OR_LAST_KNOWN_LOCATION
        - INITIAL_LOCATION
        - NOTIFICATION_VERIFICATION_ONLY
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
  description: |
    Contains the location type requested by the LCS client.
    Possible values are:
    - CURRENT_LOCATION: Requesting the current location of the target UE.
    - CURRENT_OR_LAST_KNOWN_LOCATION: Requesting the current or last known location.
    - INITIAL_LOCATION: Requesting the initial location of the target UE.
    - NOTIFICATION_VERIFICATION_ONLY: Requesting notification verification only.

EventNotifyDataType:
  anyOf:
    - type: string
      enum:
        - UE_AVAILABLE
        - PERIODIC
        - ENTERING_INTO_AREA
        - LEAVING_FROM_AREA
        - BEING_INSIDE_AREA
        - MOTION
        - MAXIMUM_INTERVAL_EXPIRATION_EVENT
        - LOCATION_CANCELLATION_EVENT
        - ACTIVATION_OF_DEFERRED_LOCATION
        - UE_MOBILITY_FOR_DEFERRED_LOCATION
        - 5GC_MT_LR
        - DIRECT_REPORT_EVENT
        - CUMULATIVE_EVENT_REPORT
    - type: string

```

```
description: >
  This string provides forward-compatibility with future
  extensions to the enumeration but is not used to encode
  content defined in the present version of this API.
description: |
  Contains the type of event that triggers event notification.
  Possible values are:
  - UE_AVAILABLE: UE available event.
  - PERIODIC: Periodic event.
  - ENTERING_INTO_AREA: Entering area event.
  - LEAVING_FROM_AREA: Leaving area event.
  - BEING_INSIDE_AREA: Being inside area event.
  - MOTION: Motion event.
  - MAXIMUM_INTERVAL_EXPIRATION_EVENT: Expiration of maximum reporting interval event.
  - LOCATION_CANCELLATION_EVENT: Cancellation of location reporting event.
  - ACTIVATION_OF_DEFERRED_LOCATION: Deferred location request activated.
  - UE_MOBILITY_FOR_DEFERRED_LOCATION: Mobility of the target UE to a different NF.
  - 5GC_MT_LR: Report of immediate 5GC MT location.
  - DIRECT_REPORT_EVENT: Direct location reporting event.
  - CUMULATIVE_EVENT_REPORT: Cumulative event report for events reported.

FailureCause:
  anyOf:
    - type: string
      enum:
        - POSITIONING_DENIED
        - UNSUPPORTED_BY_UE
        - NOT_REGISTERED_UE
        - UNSPECIFIED
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
description: |
  Positioning failure cause.
  Possible values are:
  - POSITIONING_DENIED: Positioning is denied.
  - UNSUPPORTED_BY_UE: Positioning is not supported by UE.
  - NOT_REGISTERED_UE: UE doesn't register.
  - UNSPECIFIED: Unspecified.

SuccessType:
  anyOf:
    - type: string
      enum:
        - SUCCESS_COMPLETELY
        - SUCCESS_PARTIALLY
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
description: |
  Success Type to indicate full or partial success.
  Possible values are:
  - SUCCESS_COMPLETELY: It is completely successful.
  - SUCCESS_PARTIALLY: It is partially successful.

ReportingInd:
  anyOf:
    - type: string
      enum:
        - INSIDE_REPORTING
        - OUTSIDE_REPORTING
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
description: |
  Indicates whether the UE is allowed to generate and send the event report inside or outside
  the event report allowed(expected) area.
  Possible values are:
  - INSIDE_REPORTING: Reporting when UE is inside the event report allowed/expected area.
  - OUTSIDE_REPORTING: Reporting when UE is outside the event report allowed/expected area.

IntegrityComputingEntity:
```

```
anyOf:
- type: string
  enum:
  - UE
  - LMF
  - BOTH
- type: string
  description: >
    This string provides forward-compatibility with future
    extensions to the enumeration but is not used to encode
    content defined in the present version of this API.
description: |
  Integrity Computing Entity.
  Possible values are:
  - UE: The integrity result was calculated (and determined) by UE.
  - LMF: The integrity result was calculated (and determined) by LMF.
  - BOTH: The integrity result was calculated (and determined) by both UE and LMF.
```

Annex B (informative): Change history

| Change history | | | | | | | |
|----------------|---------|--|------|-----|-----|--|-------------|
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 2019-04 | CT4#90 | C4-191340 | | | | Initial Draft of Gateway Mobile Location Services | 0.1.0 |
| 2019-05 | CT4#91 | C4-192485 | | | | V0.2.0 | 0.2.0 |
| 2019-09 | CT4#93 | C4-193845 | | | | Implementation of pCRs agreed at CT4#93 | 0.3.0 |
| 2019-10 | CT4#94 | C4-194555 | | | | Implementation of pCRs agreed at CT4#94 | 0.4.0 |
| 2019-11 | CT4#95 | C4-195413, C4-195409, C4-195296 | | | | Implementation of pCRs agreed at CT4#95 | 0.5.0 |
| 2019-12 | CT#86 | CP-193065 | | | | TS presented for information | 1.0.0 |
| 2020-03 | CT4#96e | C4-200725, C4-200727, C4-200943, C4-200993, C4-200995, C4-201286 | | | | Implementation of pCRs agreed at CT4#96e | 1.1.0 |
| 2020-03 | CT#87e | CP-200060 | | | | TS presented for approval | 2.0.0 |
| 2020-03 | CT#87e | | | | | Approved at CT87e | 16.0.0 |
| 2020-04 | CT#87e | C4-202409 | 0001 | 1 | F | Correct the errors | 16.1.0 |
| 2020-04 | CT#87e | C4-202325 | 0003 | - | F | Miscellaneous corrections on TS 29.515 | 16.1.0 |
| 2020-04 | CT#87e | C4-202326 | 0004 | - | F | Removing pseudonym of UE | 16.1.0 |
| 2020-04 | CT#87e | C4-202532 | 0005 | 1 | F | UE Privacy Requirements Corrections | 16.1.0 |
| 2020-06 | CT#88e | C4-203181 | 0006 | - | F | Error corrections | 16.1.0 |
| 2020-06 | CT#88e | C4-203540 | 0007 | 1 | F | Storage of YAML files in ETSI Forge | 16.1.0 |
| 2020-06 | CT#88e | C4-203524 | 0008 | 1 | F | Correct the Example Consumer(s) in Table 5.1-1 | 16.1.0 |
| 2020-06 | CT#88e | C4-203269 | 0010 | - | F | LDRreference | 16.1.0 |
| 2020-06 | CT#88e | C4-203360 | 0003 | 1 | F | Miscellaneous corrections on TS 29.515 | 16.1.0 |
| 2020-06 | CT#88e | C4-203645 | 0011 | - | F | 3GPP TS 29.515 API Version Update | 16.1.0 |
| 2020-09 | CT#89e | CP-202112 | 0012 | 1 | F | API name correction | 16.2.0 |
| 2020-09 | CT#89e | CP-202112 | 0014 | 1 | F | Correction of CodeWord Checking for UE Notification and Verification | 16.2.0 |
| 2020-09 | CT#89e | CP-202112 | 0015 | 1 | F | Correction of Notification or Verification only for UE Positioning | 16.2.0 |
| 2020-09 | CT#89e | CP-202112 | 0016 | 1 | F | Corrections on EventNotify service operation | 16.2.0 |
| 2020-09 | CT#89e | CP-202112 | 0017 | 1 | F | Corrections on Application Errors in provide-location response | 16.2.0 |
| 2020-09 | CT#89e | CP-202112 | 0018 | 1 | F | Corrections on LocationData | 16.2.0 |
| 2020-09 | CT#89e | CP-202139 | 0020 | 2 | F | Essential correction to OpenAPI specification for LocationUpdateNotify service operation | 16.2.0 |
| 2020-09 | CT#89e | CP-202096 | 0021 | - | F | API version and External doc update | 16.2.0 |
| 2020-11 | CT#90e | CP-203050 | 0022 | 1 | F | CancelLocation for a group of UEs | 16.3.0 |
| 2020-11 | CT#90e | CP-203050 | 0023 | 2 | F | EventNotify for UEs in a group | 16.3.0 |
| 2020-11 | CT#90e | CP-203050 | 0024 | 1 | F | Provide Locations of a group of UEs | 16.3.0 |
| 2020-11 | CT#90e | CP-203050 | 0028 | - | F | Essential corrections | 16.3.0 |
| 2020-11 | CT#90e | CP-203050 | 0029 | - | F | Storage of YAML files in 3GPP Forge | 16.3.0 |
| 2020-11 | CT#90e | CP-203050 | 0030 | - | F | API version and External doc update | 16.3.0 |
| 2021-03 | CT#91e | CP-210037 | 0033 | 1 | F | HTTP 3xx redirection | 16.4.0 |
| 2021-03 | CT#91e | CP-210041 | 0032 | 1 | F | Geographic Area | 16.4.0 |
| 2021-03 | CT#91e | CP-210054 | 0035 | - | F | 29.515 Rel-16 API version and External doc update | 16.4.0 |
| 2021-03 | CT#91e | CP-210034 | 0034 | 1 | F | OpenAPI Reference | 17.0.0 |
| 2021-06 | CT#92e | CP-211026 | 0036 | 2 | B | Add Local Address | 17.1.0 |
| 2021-06 | CT#92e | CP-211028 | 0047 | - | F | Data Types Descriptions | 17.1.0 |
| 2021-06 | CT#92e | CP-211050 | 0050 | - | F | 29.515 Rel-17 API version and External doc update | 17.1.0 |
| 2021-06 | CT#92e | CP-211059 | 0040 | 1 | A | 3xx description correction for SCP | 17.1.0 |
| 2021-06 | CT#92e | CP-211059 | 0046 | 1 | A | Redirect Responses | 17.1.0 |
| 2021-06 | CT#92e | CP-211063 | 0038 | 1 | A | LCS Service Type and External Client Type | 17.1.0 |
| 2021-06 | CT#92e | CP-211063 | 0044 | - | A | Remove LcsServiceType | 17.1.0 |
| 2021-06 | CT#92e | CP-211063 | 0048 | - | A | Wrong data type name | 17.1.0 |
| 2021-09 | CT#93e | C4-214712 | 0056 | 1 | A | LCS Service Type | 17.2.0 |
| 2021-09 | CT#93e | C4-214826 | 0054 | 1 | B | Multiple QoS Class | 17.2.0 |
| 2021-09 | CT#93e | C4-214766 | 0057 | - | F | 29.515 Rel-17 API version and External doc update | 17.2.0 |
| 2021-12 | CT#94e | C4-215455 | 0059 | - | B | Higher Resolution Timestamp for Location Estimates | 17.3.0 |
| 2021-12 | CT#94e | C4-216164 | 0063 | - | A | Correct the table name of SuccessType | 17.3.0 |
| 2021-12 | CT#94e | C4-216520 | 0065 | 1 | A | Add the missing pseudonymIndicator IE in OpenAPI | 17.3.0 |
| 2021-12 | CT#94e | C4-216534 | 0067 | 1 | A | Information for HGMLC Discovery | 17.3.0 |
| 2021-12 | CT#94e | CP-213174 | 0069 | 2 | A | LCS Service Type in MO-LR | 17.3.0 |
| 2021-12 | CT#94e | C4-216481 | 0070 | - | F | 29.515 Rel-17 API version and External doc update | 17.3.0 |
| 2022-03 | CT#95e | C4-220339 | 0074 | 1 | F | Editorial corrections | 17.4.0 |
| 2022-03 | CT#95e | C4-220368 | 0072 | 1 | B | Schedule location time for GMLC | 17.4.0 |
| 2022-03 | CT#95e | C4-221352 | 0076 | - | F | Editorial corrections | 17.4.0 |
| 2022-03 | CT#95e | C4-221603 | 0077 | - | F | 29.515 Rel-17 API version and External doc update | 17.4.0 |
| 2022-06 | CT#96 | CP-221022 | 0079 | - | B | Scheduled location time for bulk operation | 17.5.0 |
| 2022-06 | CT#96 | CP-221051 | 0081 | - | F | 29.515 Rel-17 API version and External doc update | 17.5.0 |

| | | | | | | | |
|---------|--------|-----------|------|---|---|---|--------|
| 2022-09 | CT#97e | CP-222036 | 0082 | 1 | F | Indication of Network Assisted Positioning method | 17.6.0 |
| 2022-09 | CT#97e | CP-222058 | 0083 | - | F | 29.515 Rel-17 API version and External doc update | 17.6.0 |
| 2022-12 | CT#98e | CP-223028 | 0084 | 1 | F | Missing mandatory status codes in OpenAPI | 18.0.0 |
| 2022-12 | CT#98e | CP-223033 | 0085 | - | F | 29.515 Rel-18 API version and External doc update | 18.0.0 |
| 2023-03 | CT#99 | CP-230065 | 0090 | - | F | Correction on the figure of EventNotify | 18.1.0 |
| 2023-03 | CT#99 | CP-230032 | 0093 | 2 | B | Location service in PNI-NPN with signalling optimisation | 18.1.0 |
| 2023-03 | CT#99 | CP-230032 | 0094 | 1 | B | Support of LMF selection | 18.1.0 |
| 2023-03 | CT#99 | CP-230032 | 0095 | 1 | B | Support of location comparison task | 18.1.0 |
| 2023-03 | CT#99 | CP-230032 | 0096 | 2 | B | Support of low power and high accuracy positioning | 18.1.0 |
| 2023-03 | CT#99 | CP-230071 | 0098 | - | F | 29.515 Rel-18 API version and External doc update | 18.1.0 |
| 2023-06 | CT#100 | CP-231026 | 0097 | 3 | F | Location header description | 18.2.0 |
| 2023-06 | CT#100 | CP-231031 | 0100 | 1 | B | Add NWDAF as GMLC service consumer | 18.2.0 |
| 2023-06 | CT#100 | CP-231025 | 0101 | - | F | Miscellaneous corrections | 18.2.0 |
| 2023-06 | CT#100 | CP-231075 | 0103 | 1 | A | Missing finer periodicities than 1s and an infinite reporting amount | 18.2.0 |
| 2023-06 | CT#100 | CP-231031 | 0105 | 2 | B | Support of event report allowed area | 18.2.0 |
| 2023-06 | CT#100 | CP-231031 | 0109 | 1 | F | Update the incorrect reference | 18.2.0 |
| 2023-06 | CT#100 | CP-231026 | 0110 | - | B | OAuth2 scopes in the Ngmlc_Location API | 18.2.0 |
| 2023-06 | CT#100 | CP-231031 | 0112 | 2 | B | Add reporting indication | 18.2.0 |
| 2023-06 | CT#100 | CP-231028 | 0113 | - | F | Wrong reference number | 18.2.0 |
| 2023-06 | CT#100 | CP-231070 | 0114 | - | F | 29.515 Rel-18 API version and External doc update | 18.2.0 |
| 2023-09 | CT#101 | CP-232035 | 0117 | 1 | F | Correction on Reporting Indication | 18.3.0 |
| 2023-09 | CT#101 | CP-232063 | 0119 | - | A | Missed HA GNSS Metrics Support over SBI | 18.3.0 |
| 2023-09 | CT#101 | CP-232053 | 0120 | - | B | Support of 5GC-MT-LR procedure involving Mobile Base Station Relay | 18.3.0 |
| 2023-09 | CT#101 | CP-232035 | 0121 | 1 | B | Support on NLOS/LOS measurement indication | 18.3.0 |
| 2023-09 | CT#101 | CP-232062 | 0124 | 1 | A | Add GNSS integrity requirement | 18.3.0 |
| 2023-09 | CT#101 | CP-232060 | 0125 | - | F | 29.515 Rel-18 API version and External doc update | 18.3.0 |
| 2023-12 | CT#102 | CP-233037 | 0116 | 5 | B | Periodic or triggered location events via user plane to an LCS Client or AF | 18.4.0 |
| 2023-12 | CT#102 | CP-233037 | 0127 | 1 | B | Addition of missing interface between LMF and GMLC | 18.4.0 |
| 2023-12 | CT#102 | CP-233037 | 0128 | - | F | Correction on the description of scheduledLocTime | 18.4.0 |
| 2023-12 | CT#102 | CP-233037 | 0129 | - | B | Resolve Editor's note | 18.4.0 |
| 2023-12 | CT#102 | CP-233037 | 0130 | - | B | Support on Indoor/Outdoor indication | 18.4.0 |
| 2023-12 | CT#102 | CP-233028 | 0131 | 1 | F | HTTP RFCs obsoleted by IETF RFC 9113 | 18.4.0 |
| 2023-12 | CT#102 | CP-233072 | 0136 | - | A | Incomplete CR implementation | 18.4.0 |
| 2023-12 | CT#102 | CP-233295 | 0137 | 4 | B | Update on Ngmlc_Location_ProvideLocation service for ranging_SL | 18.4.0 |
| 2023-12 | CT#102 | CP-233037 | 0138 | 2 | F | Reporting Indication Definition Alignment to Stage 2 | 18.4.0 |
| 2023-12 | CT#102 | CP-233037 | 0139 | 1 | B | Multiple QoS for Deferred Location Service Continuation from 5GS to EPS | 18.4.0 |
| 2023-12 | CT#102 | CP-233030 | 0140 | - | F | ProblemDetails RFC 7807 obsoleted by 9457 | 18.4.0 |
| 2023-12 | CT#102 | CP-233060 | 0144 | - | F | 29.515 Rel-18 API version and External doc update | 18.4.0 |
| 2024-03 | CT#103 | CP-240045 | 0151 | - | B | coordinate id in case of absolute locations | 18.5.0 |
| 2024-03 | CT#103 | CP-240045 | 0145 | 1 | F | GPSI and SUPI Support for Related UEs in GMLC API | 18.5.0 |
| 2024-03 | CT#103 | CP-240045 | 0146 | 1 | B | Ngmlc Location Privacy Check and ID Mapping Service Operation | 18.5.0 |
| 2024-03 | CT#103 | CP-240045 | 0147 | 1 | B | Application Layer Id Support for 5G-MT-LR | 18.5.0 |
| 2024-03 | CT#103 | CP-240045 | 0150 | 1 | B | update on Ngmlc_Location service for alignment and UEs belonging to different PLMN(s) | 18.5.0 |
| 2024-03 | CT#103 | CP-240045 | 0154 | 1 | F | Aligning distance and location terminology with stage 2 | 18.5.0 |
| 2024-03 | CT#103 | CP-240045 | 0155 | 1 | F | Corrections on Application Layer ID | 18.5.0 |
| 2024-03 | CT#103 | CP-240045 | 0152 | 3 | B | Ngmlc_Location_ProvideRanging | 18.5.0 |
| 2024-03 | CT#103 | CP-240053 | 0149 | - | F | OAuth2 Scope Correction in Table | 18.5.0 |
| 2024-03 | CT#103 | CP-240053 | 0148 | 1 | F | Application Error for Maximum Number of UE Exceeded | 18.5.0 |
| 2024-03 | CT#103 | CP-240053 | 0158 | 2 | F | Clarification on URI Path Segment Naming Conventions for Custom operations | 18.5.0 |
| 2024-03 | CT#103 | CP-240056 | 0162 | - | F | 29.515 Rel-18 API version and External doc update | 18.5.0 |
| 2024-06 | CT#104 | CP-241056 | 0166 | - | A | Integrity Result | 18.6.0 |
| 2024-06 | CT#104 | CP-241030 | 0167 | 1 | F | Remove the ENs for security parameters in the UPP | 18.6.0 |
| 2024-06 | CT#104 | CP-241030 | 0171 | 1 | F | Updates on integrity requirement | 18.6.0 |
| 2024-06 | CT#104 | CP-241045 | 0172 | 1 | F | Updates on feature description | 18.6.0 |
| 2024-06 | CT#104 | CP-241045 | 0175 | 1 | F | Remove Ngmlc_Location_ProvideRanging | 18.6.0 |
| 2024-06 | CT#104 | CP-241050 | 0173 | 1 | D | Editorial corrections | 18.6.0 |
| 2024-06 | CT#104 | CP-241050 | 0174 | 1 | F | Style Corrections of Nlmf_Location API | 18.6.0 |
| 2024-06 | CT#104 | CP-241045 | 0176 | 2 | F | Privacy notification and verification for UEs belonging to different PLMN(s) | 18.6.0 |
| 2024-06 | CT#104 | CP-241028 | 0177 | - | B | Returning UNSUPPORTED_EVENT_TYPE | 18.6.0 |
| 2024-06 | CT#104 | CP-241048 | 0182 | - | B | Add MBSR positioning indication | 18.6.0 |
| 2024-06 | CT#104 | CP-241045 | 0181 | 1 | F | Alignment with naming conventions. | 18.6.0 |

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|---------|--------|-----------|------|---|---|---|--------|
| 2024-06 | CT#104 | CP-241045 | 0183 | 1 | F | Update privacy check for UEs belonging to different PLMN(s) | 18.6.0 |
| 2024-06 | CT#104 | CP-241050 | 0178 | 1 | F | Add missing condition for conditional parameters | 18.6.0 |
| 2024-06 | CT#104 | CP-241050 | 0179 | 1 | F | Add missing description in the API | 18.6.0 |
| 2024-06 | CT#104 | CP-241050 | 0180 | 1 | F | Updates on naming convention for enumeration | 18.6.0 |
| 2024-06 | CT#104 | CP-241052 | 0184 | - | F | 29.515 Rel-18 API version and External doc update | 18.6.0 |
| 2024-09 | CT#105 | CP-242033 | 0186 | 2 | F | Usage of the common application errors | 19.0.0 |
| 2024-12 | CT#106 | CP-243046 | 0187 | 1 | B | Add MWAB indication | 19.1.0 |
| 2024-12 | CT#106 | CP-243025 | 0191 | 1 | A | Correction to the user location report attributes | 19.1.0 |
| 2024-12 | CT#106 | CP-243060 | 0193 | 1 | B | NRPPa Periodic Indication | 19.1.0 |
| 2024-12 | CT#106 | CP-243069 | 0194 | - | F | API version and External doc update | 19.1.0 |
| 2025-03 | CT#107 | CP-250032 | 0195 | - | F | Update on the LmfIdentification | 19.2.0 |
| 2025-03 | CT#107 | CP-250032 | 0196 | - | D | Editorial corrections | 19.2.0 |
| 2025-03 | CT#107 | CP-250046 | 0197 | - | F | Remove Nullvalue for UP Location Reporting AF Address | 19.2.0 |
| 2025-03 | CT#107 | CP-250048 | 0198 | 2 | F | Support of 5GC-MT-LR procedure involving MWAB | 19.2.0 |
| 2025-03 | CT#107 | CP-250137 | 0200 | - | F | API version and External doc update | 19.2.0 |
| 2025-06 | CT#108 | CP-251069 | 0202 | 1 | B | MWAB privacy check | 19.3.0 |
| 2025-06 | CT#108 | CP-251055 | 0204 | 1 | F | Add description for ENUM data type | 19.3.0 |
| 2025-06 | CT#108 | CP-251079 | 0205 | - | F | API version and External doc update | 19.3.0 |
| 2025-09 | CT#109 | CP-252176 | 0206 | - | F | API version and External doc update | 19.4.0 |
| 2025-12 | CT#110 | CP-253143 | 0207 | 1 | F | Correct the description of some conditional attributes | 19.5.0 |
| 2025-12 | CT#110 | CP-253167 | 0208 | - | F | API version and External doc update | 19.5.0 |

History

| Version | Date | Status |
|----------------|---------------|---------------|
| V19.4.0 | January 2026 | Publication |
| V19.5.0 | February 2026 | Publication |
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