



Open Source Telecom Signaling

Release Notes

for jSS7 v9.0.0-318

Reigniting telecom innovation and sustainable profitability via open source signaling solutions



jSS7 v9.0.0-318 Release Notes

Continuous innovation is a core value of PAiCore Technology and the new release of our jSS7, version 9.0.0-318, is the latest testament to this.

This update describes the parameters added to PAiCore’s SS7 stack (jSS7) to comply with the latest release of the MAP specification, as defined in 3GPP Release 18 (3GPP TS 29.002 v18.0.0).

Main capabilities added through these new informant elements include, among others, Power Saving Mode (PSM) and Extended Discontinuous Reception (eDRX) parameters, relevant for Cellular IoT; request and retrieval of 5GS location information; critical information for SMS over LTE/5G and IP-SM-GW; immediate reattach request on cancel location operation; support for dedicated core networks.

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IMPROVEMENTS: 119

MOBILITY SERVICES IMPROVED

Authentication Management

- **MAP-SEND-AUTHENTICATION-INFO.**

- Parameters added to **MAP SAI** request/indication:
 - *UE Usage Type Request Indication*: indicates by its presence that the HLR (if it supports the Dedicated Core Network functionality) includes the UE Usage Type in the response to the SGSN.
- Parameters added to **MAP SAI** response/confirm:
 - *UE Usage Type*: shall be present if UE Usage Type Request Indication was present in the request and the HLR supports the Dedicated Core Networks functionality (see 3GPP TS 23.060) and a UE Usage Type is available in the subscription data of the user (Dedicated Core Network functionality example: IoT).

Location Management

- **MAP-UPDATE-LOCATION**

- Parameters added to **MAP UL** request/indication:
 - *Equivalent PLMN List*: indicates the equivalent PLMN list of which the VLR requests the corresponding CSG Subscription data.
 - *MME-Diameter-Address-For MT-SMS*: sent by an IWF that registers an MME for MT-SMS. The MME-Diameter-Address-For-MT-SMS may be stored in the HLR and later be sent in SMS interrogation responses to SMS-GMSCs (SMSCs).

- **MAP-CANCEL-LOCATION:**

- Parameters added to **MAP CL** request/indication:
 - *Reattach Required*: when present and when the Cancellation Type indicates a subscription withdraw, this parameter indicates that the MME (informed via the IWF) or the SGSN shall delete the subscription data and request the UE or MS to initiate an immediate re-attach procedure as described in 3GPP TS 23.401 and in 3GPP TS 23.060.

- **MAP-PURGE-MS**

- Parameters added to **MAP PMS** request/indication:
 - *Last known location*: contains the last known location of the purged UE, which can be one of the following (optional) information elements:
 - Location Information: location information of the served subscriber at the VLR as defined in 3GPP TS 23.018.
 - Location Information for GPRS: location information of the served subscriber at the SGSN as defined in 3GPP TS 23.078.
 - Location Information for EPS: location information of the served subscriber at the MME (via an IWF).

- **MAP-UPDATE-GPRS-LOCATION**

- Parameters added to **MAP UGL** request/indication:
 - *Equivalent PLMN List*: indicates the equivalent PLMN list of which the MME/SGSN requests the corresponding CSG Subscription data.
 - *MME Number for MT SMS*: contains the ISDN number of the MME allocated for MT SMS (see 3GPP TS 23.003). It is present when the MME requests to be registered for SMS.
 - *SMS-Only*: indicates to the HSS that the UE needs only PS domain services and SMS services.

- *SMS Register Request*: indicates to the HSS that:
 - if the MME (via IWF) needs to be registered for SMS, prefers not to be registered for SMS or has no preference to be registered for SMS, see 3GPP TS 23.272.
 - if the SGSN needs to be registered for SMS, prefers not to be registered for SMS or has no preference to be registered for SMS, see 3GPP TS 23.060.
- *Removal of MME Registration for SMS*: parameter indicates by its presence that the MME requests to remove its registration for SMS.
- *SGSN Name*: provided in a request when the serving node is an SGSN and the SGSN supports Lgd interface for LCS and/or Gdd interface for SMS.
- *SGSN Realm*: provided in a request when the serving node is an SGSN and the SGSN supports Lgd interface for LCS and/or Gdd interface for SMS.
- *Lgd Support Indicator*: indicates to the HSS that the SGSN supports Lgd interface for LCS. When absent the SGSN supports only Lg interface for LCS, if LCS is supported.
- *Adjacent PLMNs*: indicates the list of PLMNs where an UE served by the SGSN is likely to make a handover from the PLMN where the SGSN is located. This list is statically configured by the operator in the SGSN, according to the geographical disposition of the different PLMNs in that area, the roaming agreements, etc.
- Parameters added for **MAP UGL** response/confirm:
 - *MME Registered for SMS*: indicates by its presence that the HSS has registered the MME for SMS.

Subscriber Management

• MAP-INSERT-SUBSCRIBER-DATA

- Parameters added to **MAP ISD** request/indication:
 - *VPLMN CSG Subscription Data*: contains a list of CSG-Ids, the associated expiration dates (see 3GPP TS 22.011). When the VLR or SGSN or MME receives VPLMN CSG Subscription Data from the CSS, it shall replace the stored VPLMN-CSG Subscription Data from the CSS (if any) with the received VPLMNCSG Subscription data. This parameter is used by the VLR, the SGSN and MME.
 - *Additional MSISDN*: If subscribed, the Additional MSISDN is included at location updating and when it is changed. This parameter is used by the SGSN and IWF. This parameter shall be ignored by the VLR if received.
 - *PS and SMS-only Service Provision*: indicates whether the subscription is for PS Only and permits CS service access only for SMS.
 - *SMS in SGSN Allowed*: indicates whether the HSS allows SMS to be provided by SGSN over NAS.
 - *CS-to-PS-SRVCC-Allowed-Indicator*: indicates by its presence to the MSC Server enhanced for ICS (see 3GPP TS 23.292) that CS to PS SRVCC is subscribed. This parameter is used by the VLR
 - *P-CSCF Restoration Request*: indicates by its presence that the HSS requests to the SGSN or the MME (via the IWF) the execution of the HSS-based P-CSCF restoration procedures, as described in 3GPP TS 23.380.
 - *Adjacent Access Restriction Data list*: indicates the allowed RAT in each one of the indicated PLMN IDs, according to subscription data.
 - *IMSI-Group-Id List*: a list of IMSI-Group-Id parameters each of which identifies an IMSI-Group the subscriber belongs to.

- *UE Usage Type*: indicates the usage characteristics of the UE that enables the selection of a specific Dedicated Core Network. It shall not be sent to VLRs and shall not be sent to SGSNs that did not indicate support of the Dedicated Core Network functionality within MAP UGL . When the MAP ISD operation is used within an MAP UGL Dialogue, the HLR shall include this parameter if the SGSN indicated support of the Dedicated Core Network functionality and a UE Usage Type is available in the subscription data of the user. Outside the MAP UGL Dialogue the HLR shall include this parameter to the SGSN that supports the Dedicated Core Network functionality if the value changed.
- *User Plane Integrity Protection Indicator*: indicates by its presence that the SGSN may decide to activate integrity protection of the user plane when GERAN is used (see 3GPP TS 43.020).
- *DL-Buffering Suggested Packet Count*: indicates a suggested DL-Buffering Packet Count. The MME (via IWF) and SGSN may take it into account in addition to local policies, to determine whether to invoke extended buffering of downlink packets at the SGW for High Latency Communication. Otherwise, the MME or SGSN shall make this determination based on local policies only (see 3GPP TS 29.272).
- *Reset-ID List*: contains a list of subscribed Reset-IDs.
- *eDRX-Cycle-Length List*: this list shall contain the subscribed eDRX cycle length, along with the RAT type to which it is applicable.
- *Ext Access Restriction Data*: indicates if:
 - 5G NR as secondary RAT is not allowed.
 - Unlicensed Spectrum as secondary RAT is not allowed.
- *IAB-Operation-Allowed-Indicator*: indicates by its presence that IAB operation is authorized for the UE. See 3GPP TS 23.401.
- Parameters added for **MAP ISD** response/confirm:
 - Ext Supported Features: indicates if unlicensed spectrum as secondary RAT is allowed.
- **MAP-DELETE-SUBSCRIBER-DATA**:
 - Parameters added to **MAP DSD** request/indication:
 - *Subscribed Periodic RAU-TAU Timer Withdraw*: indicates that subscribed Periodic RAU-TAU Timer value shall be deleted from the SGSN or the MME.
 - *Subscribed Periodic LAU Timer Withdraw*: indicates that subscribed Periodic LAU Timer value shall be deleted from the VLR.
 - *Additional MSISDN Withdraw*: indicates that Additional MSISDN shall be deleted from the SGSN or MME.
 - *CS-to-PS-SRVCC Withdraw*: indicates by its presence that CS to PS SRVCC is no longer subscribed.
 - *User Plane Integrity Protection Withdraw*: indicates by its presence that User Plane Integrity Protection may no longer be required.
 - *DL-Buffering Suggested Packet Count Withdraw*: indicates by its presence that a suggested DL-Buffering Packet Count is no longer subscribed.
 - *UE-Usage-Type Withdraw*: indicates by its presence that a UE-Usage-Type is no longer subscribed. The HLR shall include this parameter towards the SGSN or MME (via IWF) that supports the Dedicated Core Network functionality if the subscription to a UE-Usage-Type is removed. This parameter is not applicable for VLRs.
 - *Reset-IDs Withdraw*: indicates by its presence that Reset-IDs are no longer subscribed.
 - *IAB-Operation-Withdraw*: indicates by its presence that IAB operation is no longer authorized for the UE.
 - No new parameters needed to be added to **MAP DSD** response/confirm.

Subscriber Information

- **MAP-ANY-TIME-INTERROGATION**

- Parameters added to **MAP ATI** request/indication:
 - Within *Requested Info* parameter, the following have been added:
 - *T-ADS data*: indicates by its presence the requests of Terminating Access Domain Selection (term given to the process which takes place at an SCC-AS to determine whether or not MT call signaling should be sent to the PS or CS domain in order to contact the called party).
 - *Requested Nodes*: indicates the serving node (MME or an SGSN).
 - *Serving Node Indication*: indicates by its presence that only the serving node's address (MME-Name or SGSN-Number or VLR-Number) is requested.
 - *Local Time Zone Request*: indicates by its presence the request of the local time zone of the serving node.
- Parameters added to **MAP ATI** response/confirm:
 - Within *Subscriber Info* parameter, the following have been added:
 - *Time Zone*: contains the local time zone of the serving node.
 - *Daylight Saving Time*: contains the time shift corresponding to daylight saving time at the serving node time zone.
 - *Location Information 5GS*: contains the location information of the target subscriber within the 5GS, including optional parameters such as NR Cell Global Identity, E-UTRAN Cell Global Identity, Geographic information, Geodetic information, NR Tracking Area Identity, E-UTRAN Tracking Area Identity, if location retrieved is current, age of location information, VPLMN Identity, local time zone, Radio Access Technology (RAT) type.

- **MAP-PROVIDE-SUBSCRIBER-INFO**

- Parameters added to **MAP PSI** request/indication:
 - Within *Requested Info* parameter, the following have been added:
 - *T-ADS data*: indicates by its presence the requests of Terminating Access Domain Selection (term given to the process which takes place at an SCC-AS to determine whether or not MT call signaling should be sent to the PS or CS domain in order to contact the called party).
 - *Requested Nodes*: indicates the serving node (MME or an SGSN).
 - *Serving Node Indication*: indicates by its presence that only the serving node's address (MME-Name or SGSN-Number or VLR-Number) is requested.
 - *Local Time Zone Request*: indicates by its presence the request of the local time zone of the serving node.
- Parameters added to **MAP PSI** response/confirm:
 - Within *Subscriber Info* parameter, the following have been added:
 - *Time Zone*: contains the local time zone of the serving node.
 - *Daylight Saving Time*: contains the time shift corresponding to daylight saving time at the serving node time zone.
 - *Location Information 5GS*: contains the location information of the target subscriber within the 5GS, including optional parameters such as NR Cell Global Identity, E-UTRAN Cell Global Identity, Geographic information, Geodetic information, NR Tracking Area Identity, E-UTRAN Tracking Area Identity, if location retrieved is current, age of location information, VPLMN Identity, local time zone, Radio Access Technology (RAT) type.

FAULT RECOVERY SERVICES IMPROVED

- **MAP_RESET** (MAP_RESET is a non-confirmed service, thus response/confirm does not apply):
 - Parameters added to **MAP RST** request/indication:
 - *Sending Node Number*: for a restart of the HLR/HSS, this parameter shall contain the HLR number; for a restart of the CSS, this parameter shall contain the CSS number.
 - *HLR Id List*: contains a list of HLR Ids. When present, the VLR, SGSN or MME may base the retrieval of subscribers to be restored on their IMSI: the subscribers affected by the reset are those whose IMSI leading digits are equal to one of these numbers. If the parameter and the *Reset-ID List* is absent, subscribers to be restored are those for which the Originating Entity Number received at location updating time matches the equivalent parameter of the Reset Indication.
 - This parameter shall only be applicable for a restart of the HLR/HSS. It shall not be present if Reset-ID LIST is present
 - *Reset-ID List*: contains a list of Reset-IDs. It shall not be present if Reset-IDs are not supported by the HLR/HSS and by the VLR or SGSN or MME (via IWF). When present, the VLR, the SGSN or the MME may base the retrieval of affected subscribers (i.e. those impacted by the restoration or by the shared data update) on their subscribed Reset-IDs: The subscribers affected by the reset are those whose subscription contains at least one of these Reset-IDs.
 - *Subscription Data*: if the reset procedure is used to add/ modify subscription data shared by multiple subscribers, this parameter shall contain the part of the subscription profile that either is to be added to the subscription profile stored in the VLR, MME or SGSN or combined MME/SGSN or is replacing a part of the subscription profiles of the impacted subscribers stored in the VLR, MME or SGSN.
 - Shall be absent if Subscription Data Deletion is present.
 - Shall be absent if Reset-ID LIST is absent
 - *Subscription Data Deletion*: if the reset procedure is used to delete subscription data shared by multiple subscribers, this parameter shall contain the identifications of the part of the subscription profile that is to be deleted from the subscription profiles of the impacted subscribers stored in the VLR, MME or SGSN.
 - Shall be absent if Subscription Data is present.
 - Shall be absent if Reset-ID LIST is absent

ADDITIONAL PARAMETERS ARE NOW INCLUDED FOR SHORT MESSAGE SERVICES

- **MAP-SEND-ROUTING-INFO-FOR-SM**
 - Parameters added to **MAP SRISM** request/indication:
 - *SMSF Support Indicator*: indicates that the requesting node is capable of receiving ISDN numbers and/or Diameter addresses of the SMSF as target of MT-SMS.
 - Parameters added to **MAP SRISM** response/confirm:
 - Within LocationInfoWithLMSI, the following parameters have been added:
 - *Network Node Diameter Address*: refers to the Diameter Name and Realm of the same MT-SMS target node or SMS Router of which the ISDN number is within the Network Node number parameter.

- *Additional Network Node Diameter Address*: refers to an additional Diameter Name and Realm of the same MT-SMS target node or SMS Router of which the ISDN number is within the Additional number parameter.
- *Third Number*: refers to the ISDN number of a third MT-SMS target node (MSC or MME or SGSN).
- *Third Network Node Diameter Address* : refers to the third Diameter Name and Realm of the same MT-SMS target node of which the ISDN number is within the Third number parameter.
- *IMS Node Indicator*: indicates by its presence that the Network Node Number sent by the HLR is an IP-SM-GW number.
- *SMSF 3GPP Number*: contains the ISDN number of the SMSF target node for MT-SMS over 3GPP access.
- *SMSF 3GPP Diameter Address*: contains the Diameter Name and Realm of the SMSF target node for MT-SMS over 3GPP access.
- *SMSF Non-3GPP Number*: contains the ISDN number of the SMSF target node for MT-SMS over non-3GPP access.
- *SMSF Non-3GPP Diameter Address*: contains the Diameter Name and Realm of the SMSF target node for MT-SMS over non-3GPP access.
- *SMSF 3GPP Address Indicator*: indicates that the parameter Network Node Number (and Network Node Diameter Address, if present) contains the address of an SMSF for 3GPP access.
- *SMSF Non-3GPP Address Indicator*: indicates that the parameter Network Node Number (and Network Node Diameter Address, if present) contains the address of an SMSF for non-3GPP access.

- **MAP-INFORM-SERVICE-CENTRE**

- Parameters added for **MAP ISC** request/indication:
 - *SMSF 3GPP Absent Subscriber Diagnostic SM*: Used to indicate the reason why the subscriber is absent for 5G 3GPP access. For the values for this parameter see 3GPP TS 23.040.
 - *SMSF Non 3GPP Absent Subscriber Diagnostic SM*: used to indicate the reason why the subscriber is absent for 5G Non 3GPP access. For the values for this parameter see 3GPP TS 23.040.

- **MAP-MO-FORWARD-SHORT-MESSAGE**

- Parameters added to **MAP MO-FSM** request/indication:
 - *Correlation ID*: composed of an HLR-Id identifying the destination user's HLR, a SIP-URI-B identifying the MSISDN-less destination user, and a SIP-URI-A identifying the originating user. The Correlation ID indicates by its presence that the request is sent in the context of MSISDN-less SMS delivery in IMS, and that a Report-SM-Delivery status needs to be sent to the HLR to add the SC address to the MWD.
 - *SM Delivery Outcome*: indicates the status of the mobile terminated SM delivery (three possible values: memoryCapacityExceeded(0), absentSubscriber(1), successfulTransfer(2)). Shall be present if *Correlation ID* is present and shall take one of the unsuccessful outcome values.
- No new parameters needed to be added to **MAP MO-FSM** response/confirm.

- **MAP-REPORT-SM-DELIVERY-STATUS**

- Parameters added to MAP RSMDs request/indication:
 - *IP-SM-GW-Indicator*: indicates by its presence that sm-deliveryOutcome is for delivery via IMS.
 - *IP-SM-GW SM Delivery Outcome*: used to indicate the delivery outcome for the IMS domain.

- *IP-SM-GW Absent Subscriber Diagnostic SM*: indicates the reason of the IP-SM-GW SM Delivery Outcome.
- *IMSI*
- *Correlation ID*: contains the SIP-URI-B identifying the (MSISDN-less) destination user. SIP-URI-A and HLR-ID shall be absent from this parameter.
- *SMSF 3GPP Delivery Outcome Indicator*: indicates that the delivery outcome IE is associated to the SM delivery via the SMSF for 3GPP access.
- *SMSF 3GPP SM Delivery Outcome*: used to indicate the delivery outcome at the SMSF for 3GPP access.
- *SMSF 3GPP Absent Subscriber Diagnostic SM*: used to indicate the reason why the subscriber is absent for 5G 3GPP access. For the values for this parameter see 3GPP TS 23.040.
- *SMSF Non-3GPP SM Delivery Outcome*: used to indicate the delivery outcome at the SMSF for non-3GPP access.
- *SMSF Non-3GPP Delivery Outcome Indicator*: indicates that the delivery outcome IE is associated to the SM delivery via the SMSF for Non-3GPP access.
- *SMSF Non 3GPP Absent Subscriber Diagnostic SM*: used to indicate the reason why the subscriber is absent for 5G Non 3GPP access. For the values for this parameter see 3GPP TS 23.040.
- **MAP-READY-FOR-SM**
 - Parameters added to **MAP RSM** request/indication:
 - *Maximum UE Availability Time*: indicates the timestamp (in UTC) until which a UE using a power saving mechanism (such as extended idle mode DRX) is expected to be reachable for SM Delivery. It may be included by the SGSN or MSC when notifying the HLR that the MS is reachable.
- **MAP-ALERT-SERVICE-CENTRE**
 - Parameters added to **MAP ASC** request/indication:
 - *IMSI*.
 - *Correlation ID*: when the service is used between the HLR and the SMS-IWMSC, the provided SIP-URI-B within the Correlation ID parameter shall be the identifier which is stored in the Message Waiting Data file if no MSISDN is available in a retry context of SMS for IMS UE to IMS UE without MSISDN (see 3GPP TS 23.204). HLR-ID and SIP-URI-A shall be absent.
 - *Maximum UE Availability Time*: indicates the timestamp (in UTC) until which a UE using a power saving mechanism (such as extended idle mode DRX) is expected to be reachable for SM Delivery. It may be included by the SGSN or MSC when notifying the HLR that the MS is reachable.
 - *SMS-GMSC Alert Event*: indicates the event that causes the MME (via an IWF) or the SGSN to alert the SMS-GMSC for retransmitting an MT Short Message.
 - *SMS-GMSC Diameter Address*: shall contain, if available, the Diameter Identity of the SMS-GMSC (or SMS Router) previously received in the SMS-GMSC Diameter Address IE in the MT Forward Short Message Request.
 - *New SGSN Number*: may be included if the SMS-GMSC Alert Event indicates that the MS has moved under the coverage of another MME. When present, it shall contain the E.164 number of the new MME serving the MS.

- *New SGSN Diameter Address*: shall be included if available and if the SMS-GMSC Alert Event indicates that the MS has moved under the coverage of another SGSN. When present, it shall contain the Diameter Identity of the new SGSN serving the MS.
- *New MME Number*: may be included if the SMS-GMSC Alert Event indicates that the MS has moved under the coverage of another MME. When present, it shall contain the E.164 number of the new MME serving the MS.
- *New MME Diameter Address*: shall be included if available and if the SMS-GMSC Alert Event indicates that the MS has moved under the coverage of another MME. When present, it shall contain the Diameter Identity of the new MME serving the MS.
- *New MSC Number*: may be included if the SMS-GMSC Alert Event indicates that the MS has moved under the coverage of another MSC. When present, it shall contain the E.164 number of the new MSC serving the MS.
- No new parameters needed to be added to **MAP ASC** response/confirm.
- **MAP-MT-FORWARD-SHORT-MESSAGE**
 - Parameters added to **MAP MT-FSM** request/indication:
 - *SM Delivery Timer*: indicates the SM Delivery Timer value (in seconds) set in the SMS-GMSC to the IP-SM-GW, SGSN or MSC/VLR. It may be taken into account by the domain selection procedure in the IP-SM-GW.
 - *SM Delivery Start Time*: indicates the timestamp (in UTC) at which the SM Delivery Supervision Timer was started in the SMS-GMSC.
 - *Correlation ID*: contains the SIP-URI-B identifying the (MSISDN-less) destination user and the SIP-URI-A identifying the (MSISDN-less) originating user. HLR-ID shall be absent from this parameter. When a Correlation ID is present, the IMSI parameter within SM RP DA shall be populated with the HLR-ID and the destination user is identified by the SIP-URI-B within the *Correlation ID*.
 - *SMS Over IP Only Indicator*: indicates by its presence that the IP-SM-GW shall try to deliver the short message via IMS without retrying to other domains. It shall be present in messages sent to the IP-SM-GW following a T4-Submit Trigger message (see 3GPP TS 23.682) but not in messages sent to MSC or SGSN (possibly transiting an SMS-Router).
 - *Maximum Retransmission Time*: indicates the maximum retransmission time (in UTC) until which the SMS-GMSC is capable to retransmit the MT Short Message.
 - *SMS-GMSC Address*: contains the E.164 number of the SMS-GMSC or SMS Router, in international number format as described in ITU-T Recommendation E.164.
 - *SMS-GMSC Diameter Address*: contains the Diameter Identity of the SMS-GMSC or SMS Router.
 - No new parameters needed to be added to **MAP MT-FSM** response/confirm.

NEW PARAMETERS ARE NOW INCLUDED FOR LOCATION SERVICES MANAGEMENT

- **MAP-SEND-ROUTING-INFO-FOR-LCS**
 - No new parameters needed to be added to **MAP SRILCS** request/indication.
 - Parameters added to **MAP SRILCS** response/confirm:
 - Within *LCSLocationInfo*, the following parameters have been added:
 - *SGSN Name*: includes the Diameter identity of the serving SGSN name as defined in 3GPP TS 23.003. Provided in a successful response when the serving node is an SGSN and the SGSN has indicated its support for Lgd interface.
 - *SGSN Realm*: includes the Diameter identity of the serving SGSN realm as defined in 3GPP TS 23.003. Provided in a successful response when the serving node is an SGSN and the SGSN has indicated its support for Lgd interface.

- **MAP-PROVIDE-SUBSCRIBER-LOCATION**

- Parameters added to **MAP PSL** request/indication:
 - Within PeriodicLDRInfo, the following parameter has been added:
 - ReportingOptionMilliseconds: includes ReportingAmountMilliseconds (1.8639999000) and ReportingIntervalMilliseconds (1.999). ReportingAmountMilliseconds x ReportingIntervalMilliseconds shall not exceed 8639999000 (99 days, 23 hours, 59 minutes and 59 seconds) for compatibility with OMA MLP and RLP.
- Parameters added to **MAP PSL** response/confirm:
 - *UTRAN Additional Positioning Data*: indicates the usage of each Additional positioning method that was successfully attempted to determine the location estimate. If Position Data received from the RAN contains no Additional Positioning Data Set, UTRAN Additional Positioning Data is excluded from the MAP message. It may be included in the message only if the access network is UTRAN. Id values include Barometric Pressure, WLAN, Bluetooth, MBS.
 - *UTRAN Barometric Pressure Measurement*: indicates the uncompensated barometric pressure measurement at the MS. The absence of this parameter implies that a barometric pressure measurement was not available or could not be successfully obtained. It may be included in the message only if the access network is UTRAN.
 - *UTRAN Civic Address*: indicates the civic address of the MS. The absence of this parameter implies that a civic address was not available or could not be successfully obtained. It may be included in the message only if the access network is UTRAN.
 - Added methods for obtaining the positioning methods used in GERAN Positioning Data, UTRAN Positioning Data, GERAN GANSS Positioning Data and UTRAN GANSS Positioning Data, i.e.:
 - GERAN Positioning Data: Timing Advance, Mobile Assisted E-OTD, Mobile Based E-OTD, Mobile Assisted GPS, Mobile Based GPS, Conventional GPS, U-TDOA, Reserved for UTRAN use only, Cell ID, reserved for GSM, reserved for network specific positioning methods.
 - UTRAN Positioning Data: Reserved for GERAN use only, Mobile Assisted GPS, Mobile Based GPS, Conventional GPS, U-TDOA, 01001 OTDOA, IPDL, RTT, Cell ID, reserved for other location technologies, reserved for network specific positioning methods.
 - GERAN GANSS Positioning Data: methods MS-Based, MS-Assisted, Conventional, Reserved, GANSSId: Galileo, Satellite Based Augmentation Systems (SBAS), Modernized GPS, Quasi Zenith Satellite System (QZSS), GLONASS, BDS.
 - UTRAN GANSS Positioning Data: methods MS-Based, MS-Assisted, Conventional, Reserved, GANSSId: Galileo, Satellite Based Augmentation Systems (SBAS), Modernized GPS, Quasi Zenith Satellite System (QZSS), GLONASS, BDS.

- **MAP-SUBSCRIBER-LOCATION-REPORT**

- Parameters added to **MAP SLR** request/indication:
 - *UTRAN Additional Positioning Data* (same as in MAP PSL response/confirm).
 - *UTRAN Barometric Pressure Measurement* (same as in MAP PSL response/confirm).
 - *UTRAN Civic Address* (same as in MAP PSL response/confirm).
 - Added methods for obtaining the positioning methods used in GERAN Positioning Data, UTRAN Positioning Data, GERAN GANSS Positioning Data and UTRAN GANSS Positioning Data (same as in MAP PSL response/confirm).

- Parameters added to **MAP SLR** response/confirm:
 - *H-GMLC Address*: IPv4 or IPv6 address of the Home GMLC. Shall be included if the Subscriber Location Report is the response to a deferred MT location request for a UE available event, an area event or a periodic positioning event. This parameter shall be included in a Subscriber Location Report response if a deferred MO-LR TTTP procedure is initiated for a periodic positioning event.
 - *MO-LR Short Circuit Indicator*: indicates whether MO-LR Short Circuit is permitted for periodic location.
 - *Reporting PLMN List*: indicates a list of PLMNs in which subsequent periodic MO-LR TTTP requests will be made.
 - *LCS-Reference Number*: shall be included if the Subscriber Location Report is the response to a deferred MT location request.