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1 Scope

The present document contains the definition of the SMLCPP protocol to be used between two Serving Mobile Location Centres (SMLC).

The LCS architecture is described in 3GPP TS 43.059. The following aspects of it are relevant to the issue:

- each SMLC controls a number of LMUs, and a given LMU is under the direct control of a single SMLC;
- there is a direct communication path, independent of SMLCPP, between a LMU and the SMLC that controls it;
- deciphering keys are controlled by one SMLC in the location area and sent to other SMLCs in the same location area.

SMLCPP runs between two SMLC functions in the same PLMN. Transport is outside the scope of the present document. It assumes a transport service between these functions, as provided by BSSAP-LE. The present document assumes that the underlying transport (e.g., as described by BSSAP-LE specifications) provides for transport and routing for any two pairs of SMLCs which need to run SMLCPP exchanges.

The main functions of SMLCPP are described in [5]. The key aspects are:

- a) allowing an SMLC to ask for and obtain information about Radio Interface Timing (RIT), as known from measurements done by LMUs not under its direct control;
- c) allowing an SMLC, that controls deciphering keys in the location area, to sent them to other SMLCs in the same location area.

2 References

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

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- 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 TS 21.905: "Vocabulary for 3GPP Specifications".
- [2] (void)
- [3] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".
- [4] 3GPP TS 24.008: "Mobile radio interface layer 3 specification".
- [5] 3GPP TS 43.059: "Functional Stage 2 Description of Location Services in GERAN (Release 4)".
- [6] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".
- [7] ASN.1 encoding rules 'Specification of Packet Encoding Rules (PER)' ITU-T Rec. X.691 (1997) | ISO/IEC 8825-2:1998.
- [8] (void)
- [9] Abstract Syntax Notation One (ASN.1) 'Specification of Basic Notation' ITU-T Rec.X.680 (1997) | ISO/IEC 8824 – 1:1998.
- [10] (void)

- [11] 3GPP TS 44.071: "Mobile radio interface layer 3 Location Services (LCS) specification".
- [12] 3GPP TS 49.031: "Location Services (LCS); Base Station System Application Part LCS Extension (BSSAP-LE)".

3 Abbreviations

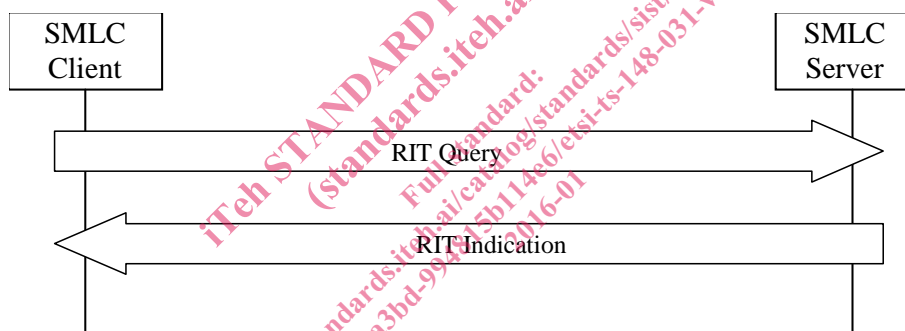
Abbreviations used in the present document are listed in 3GPP TS 21.905 or in 3GPP TS 43.059.

4 Procedures

4.1 RIT Procedures

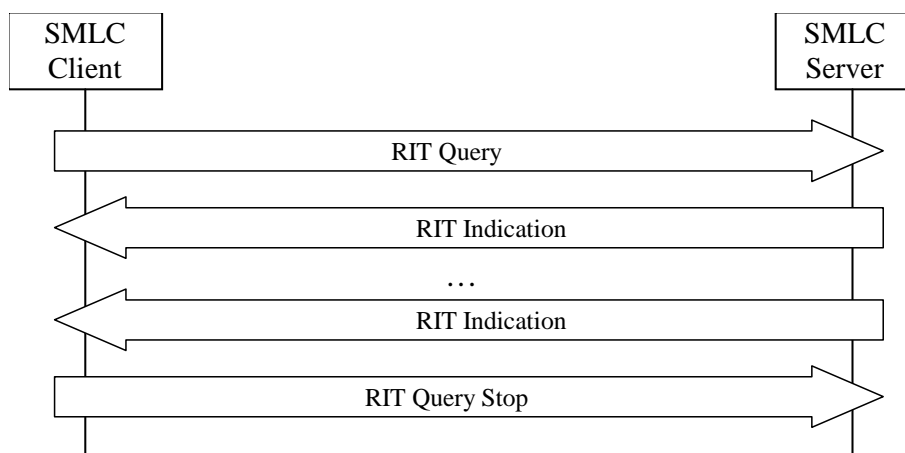
Two modes of operation are supported:

- provision of RIT information on request. In this mode a SMLC Client needing RIT information requests it from another SMLC using the RIT Query operation. The SMLC Server sends the requested RIT information using the RIT Indication operation. There are two cases:
 - single indication: RIT Indication is requested only once.



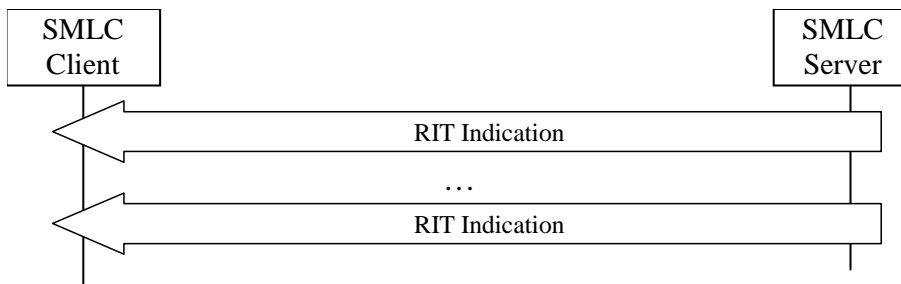
In this case the procedure consists of one RIT Query and one RIT Indication operations.

- Open-ended repetitive RIT Indications: RIT information is requested on a regular basis until the RIT Query Stop operation.



In this case the procedure consists of one RIT Query, one or more RIT Indication, and one RIT Query Stop operations.

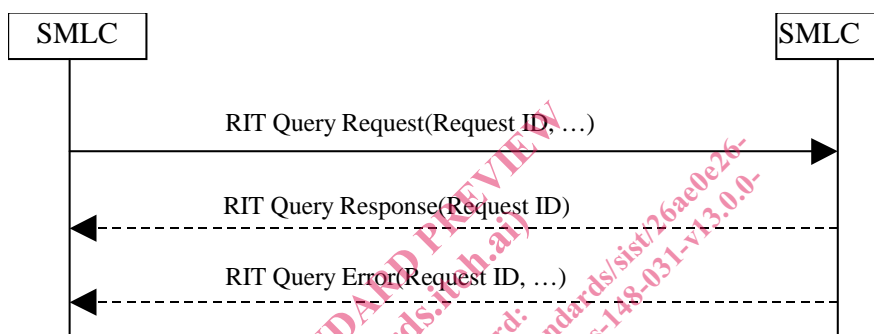
- Autonomous provision of RIT information. In this mode, the RIT information is provided automatically by the SMLC Server, according to an internal configuration not managed through SMLCPP (e.g., by O&M).



In the autonomous mode the procedure consists of one or more RIT Indication operations.

Three RIT related operations are then included in the SMLCPP, one for requesting the provision of RIT data, the second for provision, and the third one for stopping open-ended repetitive indications.

4.1.1 RIT Query Operation

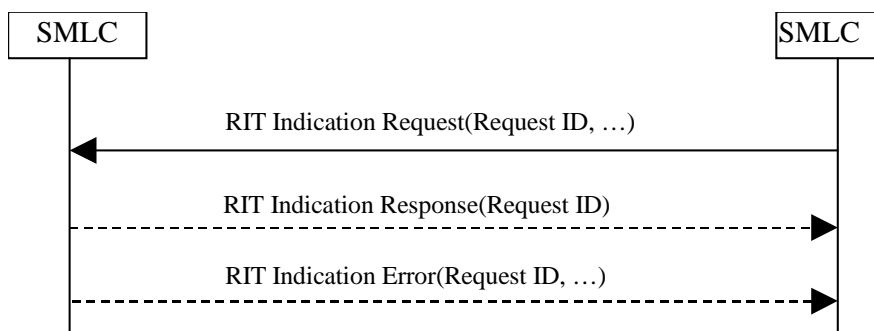


This operation allows a SMLC to query RIT information from another SMLC. This operation consists of sending of a RIT Query Request. It includes the Request ID, that is used to identify different queries. The RIT Query Request also includes the description of the scheduling of RIT Indication operations in the reverse direction. This includes the following cases:

- single indication; RIT Indication is requested only once;
- open-ended repetitive indications; RIT Indication operations are requested on a regular basis until the RIT Query Stop operation.

A RIT Query Response includes the same Request ID that the Request included, and it is used as a positive acknowledgement. A RIT Query Error message can be sent in return, if the SMLC Server detects an error situation (e.g. syntax errors, or overlapping Request ID values), or it can not fulfil the Request (e.g. RIT information is requested for unknown BTSs). It contains the same Request ID values as the Request.

4.1.2 RIT Indication Operation



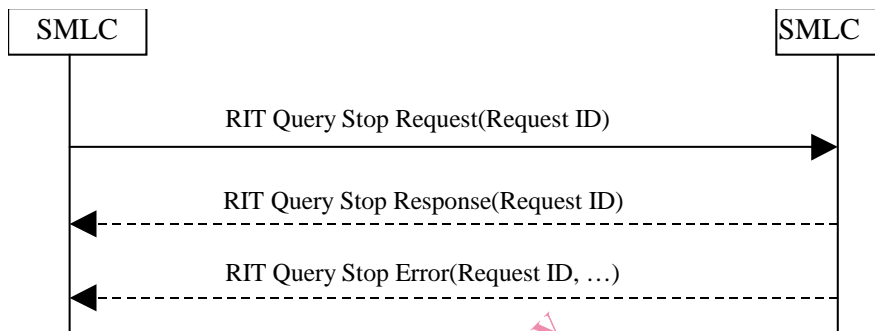
This operation allows a SMLC to send RIT information to another SMLC. It can be used both in the case of autonomous provision, and the provision of RIT information on request.

The RIT Indication Request contains RIT information to be delivered. It also contains the Request ID that:

- has the same value as the RIT Query operation, that invoked the RIT Indication (RIT provision on request);
- has a reserved value indicating autonomous provision.

A RIT Indication Response includes the same Request ID that the Request included, and it is used as a positive acknowledgement. The SMLC Client can send a RIT Indication Error to the SMLC Server, if it detects an error situation (e.g. syntax errors, or unknown Request ID values).

4.1.3 RIT Query Stop Operation



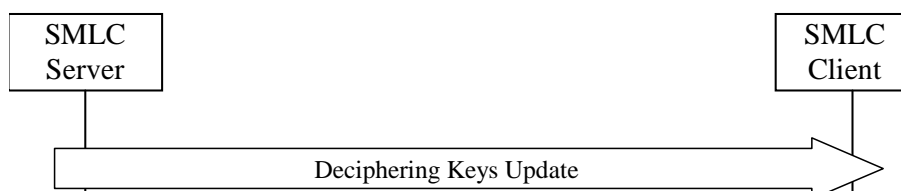
This operation allows a SMLC to send an indication to another SMLC to stop sending RIT information, that it has originally asked to obtain on open-ended repetitive basis. The RIT Query Stop Request includes the Request ID values that is the same as in the corresponding RIT Query that should be stopped. A RIT Query Stop Response includes the same Request ID that the Request included, and it is used as a positive acknowledgement. The SMLC Server can send a RIT Query Stop Error to the SMLC Client, if it detects an error situation (e.g. syntax errors, or unknown Request ID values).

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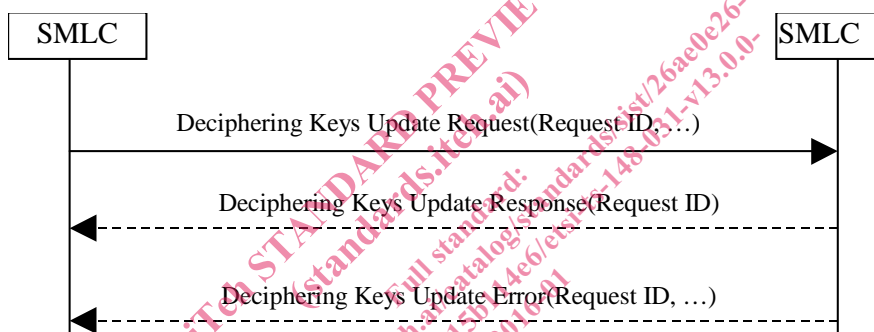
4.2 (void)

4.3 Deciphering Keys Procedure

This procedure includes one operation that is related to LCS assistance data broadcast deciphering keys. With this operation the SMLC Server controlling the deciphering keys (needed in LCS Assistance Data broadcast) can send the deciphering keys to other SMLC Clients in the same location area. One SMLC (i.e. SMLC Server) in location area is selected to control the deciphering keys and sending the keys to other SMLC Clients in location area. The sending has to be done to each SMLC Client with a separate message.



4.3.1 Deciphering Keys Update Operation



This operation allows a SMLC controlling deciphering keys to send the keys to another SMLC Client.

The Deciphering Keys Update Request includes the Request ID and information of keys. A Deciphering Keys Update Response includes only the same Request ID that the Request included, and it is used as a positive acknowledgement. The SMLC Client can send a Deciphering Keys Update Error to the SMLC Server, if it detects an error situation (e.g. syntax errors). It contains the same Request ID values as the Request.

5 Error Handling

In this Clause it is described how the SMLC should act in different error situations.

5.1 Missing Message Part

When a SMLC receives a Request message that does not contain one or more expected message parts (e.g. information elements, Arguments, Request ID), it sends an Error with the indication 'Missing Message Part' (if the operation type is known), and ignores the Request.

When a SMLC receives a Response or Error message that does not contain one or more expected message parts, it ignores the message.

5.2 Repeated Message Part

When a SMLC receives a Request message that contains one or more message parts (e.g. information elements, Arguments, Request ID) more times than expected, it sends an Error with the indication 'Repeated Message Part', and ignores the Request.