

ETSI MAP support in MTAS

INTERWORK DESCR

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Contents

1	Document History	4
2	Scope and Purpose	4
2.1	Scope	4
2.2	Interface Entities	4
2.3	Interface Role	4
2.4	Services	5
2.5	Encapsulation and Addressing	6
2.5.1	ETSI MAP interface	6
2.5.2	SIGTRAN	6
3	Procedures	8
3.1	Overview	8
3.2	Lower Level Procedures	9
3.3	MAP Send Routing Information (SRI)	9
3.4	MAP Resume Call Handling (RCH)	9
4	Information Model	10
4.1	General	10
4.1.1	Outgoing signaling sent by MTAS	10
4.1.2	Incoming signaling to MTAS	12
5	Formal Syntax or Schema	13
6	Related Standards	13
7	Terminology	13
7.1	Abbreviations	13
7.2	Definitions	15

8 **References 15**

1 Document History

Rev	Date	Sign	Comment
A	2015-04-14	ETXKRAZ	First version with support for MAP SRI.
B	2015-05-05	EYAYFEN	Update for CAMEL support and MTRR
C	2015-09-23	EXXGDDI	Update to be generalized for both MTAS(TSP) and MTASv
D	2016-03-024	XMILMAT	MTASv 10 -Updated References: CBA link to MOM

2 Scope and Purpose

2.1 Scope

The scope of this document is to describe the support of ETSI MAP in MTAS.

An ETSI MAP interface is used when MTAS is deployed as an SCC AS node and without any interface to IMS HSS. In this case a MAP interface to HLR is used to get the necessary mobile data.

In this document, MAP implies ETSI MAP.

2.2 Interface Entities

The following nodes are involved:

MTAS/GMSC: MTAS acts as a GMSC for Mobile Terminating (MT) calls when a MAP request for the Mobile Station Roaming Number (MSRN) is sent to HLR.

HLR: Gets the request from GMSC to discover the whereabouts of the MS. The visited network MSC/VLR is requested to allocate an MSRN which is returned to the GMSC.

2.3 Interface Role

MTAS when deployed as SCC AS without interface to IMS HSS supports an ETSI MAP interface to HLR for the purpose of getting MSRN from the CS domain for MT calls, see Figure 1.

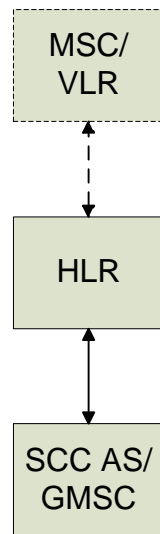


Figure 1 SCC AS ETSI MAP Interface Context

2.4 Services

The tables in the following sections describe the offered operations, i.e. the requests and responses that MTAS can receive and the used operations, i.e. the requests and responses that MTAS can send.

Table 1 Offered ETSI MAP operations

Offered Operations	Description
Resume Call Handling (RCH) request	Used to resume the terminating call procedure while the called mobile is simultaneously moving from an old to a new MSC during call establishment.

Table 2 Used ETSI MAP operations

Used Operations	Description
Send Routing Information (SRI) request	Used to perform the interrogation of the HLR for an MSRN in order to route a call towards the called MS.

2.5 Encapsulation and Addressing

2.5.1 ETSI MAP interface

The ETSI MAP operations are transported using TCAP on SIGTRAN, SS7 Signaling Transport over SCTP. The TCAP layer is according to ITU and the SCCP layer is either ITU SCCP or ANSI SCCP depending on the Signaling Network standard, this is a configuration option in the SS7 stack and in MTAS. The SCCP standard used will also be reflected in the SCTP front end.

Figure 2 shows the two options for an ETSI MAP interface depending on the associated SS7 signaling network standard.

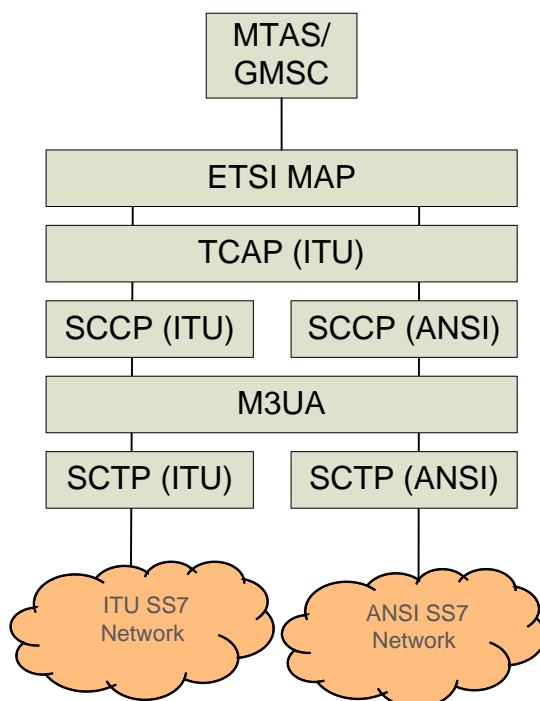


Figure 2 ETSI MAP on SIGTRAN

2.5.2 SIGTRAN

The SCCP layer is associated with the SS7 signaling network standard by a configuration option (ITU or ANSI), which is also reflected on SCTP layer. This must be considered when ITU CAP is also enabled for SSF/SCF operations (see [4]) meaning that, when ANSI SCCP selected for ETSI MAP interface, different SCTP Front Ends must be used for CAP and MAP traffic.

The used SS7 signaling network standard for ETSI MAP must also be configured in MTAS (mtasCsiMapSccpStandard) as the encoding of called and calling party number is done in the application in accordance with the standard used.

2.5.2.1 Called and Calling Party Addresses in SCCP layer

Called Party Address (HLR) and Calling Party Address (GMSC) in the used MAP operations are encoded in MTAS/GMSC application in accordance with the SS7 Signaling Network standard (ITU or ANSI) [2] and the encoding schemes that are configured in MTAS/CSI.

The MTAS/CSI configuration parameters are further described in the parameter description, see [5].

Signaling network standard=ANSI

Octet 1 with the Address Indicator:

Bit 1: SSN indicator, set to 1 (address contains SSN)

Bit 2: SPC indicator, set to 0 (address does not contain SPC)

Bit 3-6: Global Title Indicator, set according to configuration in MTAS/CSI.

Bit 7: Routing indicator, set to 0 (route on GT)

Bit 8: Reserved for National use, set to 1

Octet 2 with the SSN set to configured value for HLR subsystem number (mtasCsiMapHlrSubsystemNumber) when called party encoding and set to the configured value for SCC AS/GMSC (mtasCsiMapGmscSubsystemNumber) when calling party encoding.

Octets 3-n (max 12) with the Global Title (MSISDN address when called party address encoding and mtasCsiGlobalTitle address when calling party address encoding).

The Global Title is encoded depending on the setting of GTI, when

GTI=0: no GT address is included

GTI=1 (configured GTI=3): Translation Type + Numbering Plan + Encoding Scheme + Address, as configured in MTAS/CSI.

GTI=2: Translation Type + Address, as configured in MTAS/CSI.

Note that Encoding Scheme is coded as 1 (BCD, odd number of digits) or as 2 (BCD, even number of digits) when configured as BCD in MTAS/CSI.

Signaling network standard=ITU

Octet 1 with the Address Indicator:

Bit 1: SPC indicator, set to 0 (address does not contain SPC)

Bit 2: SSN indicator, set to 1 (address contains SSN)

Bit 3-6: Global Title Indicator, set according to configuration in MTAS/CSI.

Bit 7: Routing indicator, set to 0 (route on GT)

Bit 8: Reserved for National use, set to 1

Octet 2 with the SSN set to configured value for HLR subsystem number (mtasCsiMapHlrSubsystemNumber) when called party encoding and set to the configured value for SCC AS/GMSC (mtasCsiMapGmscSubsystemNumber) when calling party encoding.

Octets 3-n (max 14) with the Global Title (MSISDN address when called party address encoding and mtasCsiGlobalTitle address when calling party address encoding).

The Global Title is encoded depending on the setting of GTI, when

GTI=0: no GT address is included

GTI=1: Nature of Address Indicator + Address, as configured in MTAS/CSI.

GTI=2: Translation Type + Address, as configured in MTAS/CSI.

GTI=3: Translation Type + Numbering Plan + Encoding Scheme + Address, as configured in MTAS/CSI.

GTI=4: Translation Type + Numbering Plan + Encoding Scheme + Nature of Address Indicator + Address, as configured in MTAS/CSI.

Note that Encoding Scheme is coded as 1 (BCD, odd number of digits) or as 2 (BCD, even number of digits) when configured as BCD in MTAS/CSI.

3 Procedures

3.1 Overview

The used services are specified by the operations used on the interface.

Table 3 Used Services/Operations

Service	Operation
MTAS to HLR, request MSRN	MAP SRI request

The offered services are specified by the operations used on the interface.

Table 4 Offered Services/Operations

Service	Operation
vMSC to MTAS, indicate UE move to new vMSC during call	MAP RCH request

3.2 Lower Level Procedures

N/A

3.3 MAP Send Routing Information (SRI)

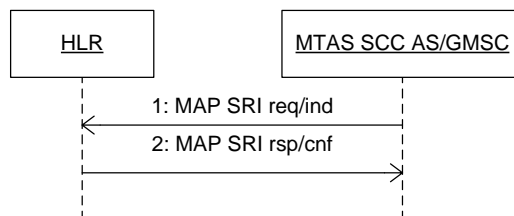


Figure 3 GMSC requests MSRN from HLR

1. MTAS sends MAP Send Routing Information (SRI) request to HLR.
2. HLR sends MAP SRI response to MTAS.

3.4 MAP Resume Call Handling (RCH)

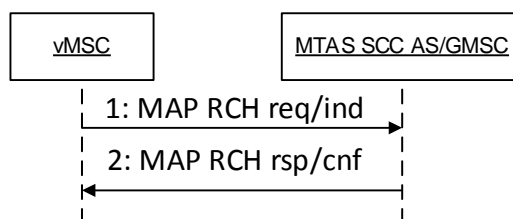


Figure 4 vMSC sends MAP RCH to MTAS

1. vMSC sends MAP Resume Call Handling (RCH) request to MTAS.
2. MTAS sends MAP RCH response to vMSC.

4 Information Model

4.1 General

This section describes the outgoing signaling sent by MTAS (MAP service requests) and the incoming signaling sent to MTAS (MAP service response).

Currently the supported operation by MTAS is initiated with a TCAP INVOKE (LAST). This is carried by a TCAP QUERY WITH PERMISSION package. Query with permission gives the receiving node permission to end the transaction at any time. All responses currently supported by MTAS are reported in TCAP RETURN RESULT (LAST) and carried by TCAP RESPONSE package. This means that the transaction is ended when response is received and transaction dialogue ID is released (TCAPId).

In the following sub-sections some parameters are set in relation to ICS TADS/GMSC (mtasTads) and CSI (mtasCsi) setting in SCC AS. For more information on those parameters, see ref [6].

4.1.1 Outgoing signaling sent by MTAS

4.1.1.1 MAP SRI request

Table 5 MAP SRI request parameters

Name	Type	Description	Comment
Invoke Id	M	A unique identifier over each service-user/service-provider interface	
Interrogation Type	M		Set to 'Basic call'.
GMSC or gsmSCF Address	M	The E.164 address of the MTAS/GMSC.	Set to mtasCsiGlobalTitle
MSISDN	M	The Mobile Subscriber ISDN number assigned to the called subscriber.	
Supported CAMEL Phases	C	The CAMEL phases supported by MTAS/GMSC.	Set to "CAMEL phase3" when mtasTadsMsrnCsi=1, otherwise set to 0 (No CAMEL phases supported)

Suppress T-CSI	C	Indication that T-CSI shall be suppressed on the terminating leg.	mtasTadsMsrnCsi=0 : set always mtasTadsMsrnCsi=1 : set in second MAP SRI for CAMEL subscribers.
Suppression of Announcement	C	Indication that announcements or tones generated as a result of unsuccessful call establishment shall be suppressed.	Set always
Call Reference Number	C	Used in MTRR to find anchored session.	set when MTRR is enabled
Pre-paging supported	C	Indication that MTAS/GMSC supports pre-paging.	Set when mtasTadsBreakoutPolicy=1 or 2
Suppress VT-CSI	C	Indication that VT CSI shall be suppressed.	Set always
Suppress Incoming Call Barring	C	Indication that incoming call barring shall be suppressed for the called party.	Set always
SuppressMTSS	C	Indication which MT supplementary services that shall be suppressed for the called party.	Suppress both CUG and CCBS.
MT Roaming Retry Supported	U	Indication that MT Roaming Retry is supported.	Set when mtasTadsMtrr=1 (except the second MAP SRI when MTRR applies)

4.1.2 Incoming signaling to MTAS

4.1.2.1 MAP SRI response

MTAS expects the parameters in a MAP SRI response according to Table 5.

Table 6 MAP SRI response parameters

Name	Type	Description	Comment
Invoke Id	M	A unique identifier over each service-user/service-provider interface	
MSRN	C	Resulting roaming number.	Present if the call is not subject to early call forwarding. Absent MSRN is considered an error case because early call forwarding is not supported in SCC AS/GMSC.
GMSC Camel Subscription Info	C	CAMEL subscription information	Returned for CAMEL subscription information indication to GMSC
Location Information	C	Location of served CAMEL subscribers	Returned for Location of the served CAMEL subscribers
User Error	C	This parameter is sent by the responder when an error is detected.	Any user error results in that the MT call establishment will not succeed in MTAS/GMSC. The call request will be rejected.

4.1.2.2 MAP RCH request

Table 7 MAP RCH request parameters

Name	Type	Description	Comment
Invoke Id	M	A unique identifier over each service-user/service-provider interface	
Call Reference Number	C	Identifies the session to served subscriber (MSISDN) subject for MTRR	
All Information Sent	C		
MSISDN	C	The Mobile Subscriber ISDN number assigned to the called subscriber.	
MT Roaming Retry	U	Indicates that reason is MTRR	

5 Formal Syntax or Schema

The formal syntax is described in [1].

6 Related Standards

See [1] and [2].

7 Terminology

7.1 Abbreviations

ANSI	American National Standards Institute
BCD	Binary Coded Decimal
C	The inclusion of the parameter is conditional
CAMEL	Customized Applications Mobile network Enhanced Logic
CAP	CAMEL Application Part

CCBS	Completion of Calls to Busy Subscriber
CS	Circuit-Switched
CSI	CAMEL Subscription Information
CUG	Closed User Group
ETSI	European Telecommunications Standards Institute
GMSC	Gateway MSC
GSM	Global System for Mobile
GT	Global Title
HLR	Home Location Register
HSS	Home Subscriber Server
IMS	IP Multimedia Subsystem
ITU	International Telecommunication Union
M	The inclusion of the parameter is mandatory
M3UA	MTP3 User Adaption Layer
MAP	Mobile Application Part
MSC	Mobile Switching Center
MS	Mobile Station
MSISDN	Mobile Station ISDN number
MSRN	MS Routing Number
MT	Mobile Terminated call
MTAS	Multimedia Telephony Application Server
MTRR	Mobile Terminating Roaming Retry
RCH	Resume Call Handling
SCC AS	Service Centralization and Continuity
SCCP	Signaling Connection Control Part
SCTP	Stream Control Transmission Protocol
SIGTRAN	Extension of SS7 protocol family which uses the IP transport SCTP
SPC	Signaling Point Code
SRI	Send Routing Information
SSN	SCCP Subsystem Number
SS7	Signaling System No 7
T-ADS	Terminating Access Domain Selection
TCAP	Transaction Capabilities Application Part
T-CSI	Terminating-CSI
U	The inclusion of the parameter is a service-user option
VLR	Visited Location Register
vMSC	Visited MSC

VT-CSI Visited Terminated-CSI
UE User Equipment

7.2 Definitions

8 References

- [1] 3GPP TS 29.002 v 9.3.0, Mobile Application Part (MAP) specification (release 9)
- [2] ITU-T Q.713 Signalling connection control part formats and codes
- [3] MTAS CAP support, 35/155 19-AVA 901 18 Uen
- [4] TSP: MTAS Parameter Description, 2/190 84-AVA 901 09/n
CBA: Managed Object Model MTAS 155 54-LZN 765 0163/n
- [5] TSP: ICS Management Guide, 71/1553-AVA 901 09/9
CBA: MTAS IMS Centralized Services Management Guide 71/1553-AVA 901 29/9