

# MTAS CAP Support

## INTERWORK DESCR

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# 1 Document History

| Rev | Date       | Sign               | Comment   |
|-----|------------|--------------------|---|
| A   | 2013-03-23 | EJABLOM            | Clone of 1/155 19-CRA 119 2111 rev D.<br>This version includes updates related to MTAS in SCF role and updates related to the IDP for MTAS in SSF role.   |
| B   | 2013-05-16 | ETXKRAZ            | calledPartyNumber in National format supported for T-SDS.   |
| B1  | 2014-04-22 | EQSAACG            | Correct the description of Generic Number data field in CON operation in 4.2.2.4.   |
| B2  | 2015-04-01 | ECAMKEM            | Updates to IMSI in IDP, Generic Number in CON, and Original Called Party ID, Redirecting Party ID and Redirection Information in IDP and CON. Other minor corrections for example for elements in PA, P&C and CIRq.   |
| B3  | 2015-04-16 | EXXGDDI            | Updated Location information and Location Number in IDP   |
| B4  | 2015-10-21 | EXXGDDI            | HT88655 CAP GenericNum not overwriting headers. Update CON. GenericNumber field in 4.2.2.4.<br>TR HT98326, check<br>DestinationRoutingAddress.NAI in CON to update the Request URI.<br>Support Redirecting Party ID and Redirection Information for MF case.  |
| B5  | 2016-02-25 | EYAYFEN<br>EXXGDDI | HT88655 CAP GenericNum not overwriting headers. Update CON. GenericNumber field in 4.2.2.4.<br>TR HT98326, check<br>DestinationRoutingAddress.NAI in CON to update the Request URI.<br>Support Redirecting Party ID and Redirection Information for MF case.<br>Update for TR HU40408.<br>Update for TR HU58924 |

|   |            |                                 |   |
|---|------------|---------------------------------|---|
| C | 2016-07-27 | EXXGDDI                         | Support IE Release If Duration Exceeded in ACH without playing tone with CM;<br>Update for TR HU98306;<br>Update the comments for IDP.IMSI.   |
| D | 2016-09-12 | EZSOOLA                         | Comment for IMSI information element updated in 4.2.1.4 "Initial Detection Point"   |
| E | 2016-11-21 | EZHAOSO<br>/EXXGDDI<br>/ETOMBAT | TR HV22650, Update IMSI information element in 4.2.1.4 "Initial Detection Point";<br>Set VLR number in IDP for WiFi;<br>Corrections to SystemFailure (ch 4.3.2.3) and UnexpectedDataValue (ch 4.3.2.6) responses to InitialDP |
| F | 2017-02-28 | EXXGDDI                         | Support Play Tone in ACH  |
| G | 2017-06-12 | EXXGDDI                         | Support B-Number based CAP Triggering   |
| H | 2017-8-24  | EXXGDDI                         | TR HW12190, update error code mapping for ERB;<br>Update for vMTAS License;<br>TR HV99038: update CM<br>mtasNccImsiBehavior   |

## 2 Scope and Purpose

### 2.1 Scope

The scope of this document is to describe the MTAS support of CAP v2 when MTAS acts as a SSF for MMTel calls influenced by IN services, and when MTAS acts as an SCF and assists in the service domain selection from MSC to deliver IMS service to ICS users.

### 2.2 Interface Entities

MTAS when deployed as an MMTel AS can allow a Service Layer application to influence calls. This is done using the CAP protocol defined in [1] and [2]. When using the CAP protocol for this purpose, MTAS has the role as SSF.

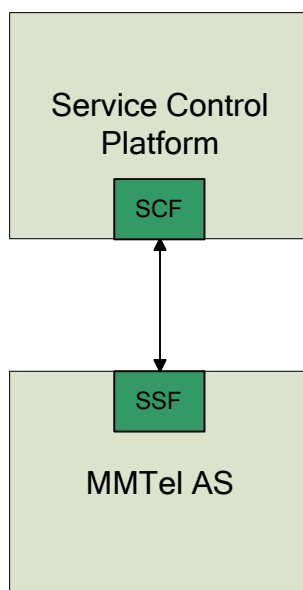
MTAS when deployed as an SCC AS can also act as an SCF for Service Domain Selection (SDS) in IMS Centralized Services (ICS), to assist MSC to select IMS as service domain for ICS users, see [10] for more information on ICS and SDS.

This document describes how MTAS deploys those interfaces.

## 2.3 Interface Role

### 2.3.1 MTAS SSF

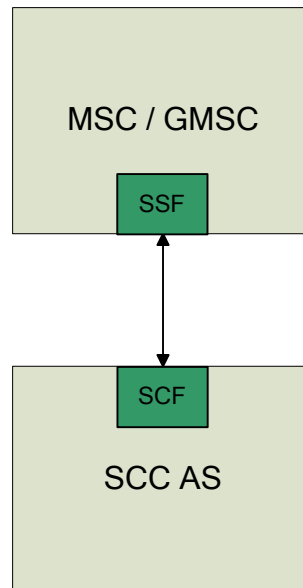
MTAS supports acting as an SSF. In the context of this document, MTAS is considered a CAP client.



*Figure 1 SSF Interface context*

### 2.3.2 MTAS SCF

MTAS when deployed as SCC AS supports acting as an SCF for Service Domain Selection within IMS Centralized Services. In the context of this document, SCC AS is considered a CAP server.



*Figure 2 SCF Interface context*

## 2.4 Services

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

### 2.4.1 MTAS SSF

*Table 1: Offered Operations*

| Offered Operations as CAP server | Description  |
|----------------------------------|--|
| Apply Charging (ACH)             | Used by the SCF for charging purposes to control the call duration.  |
| Call Information Request (CIRq)  | Used to request the SSF to record specific information about a single call party and report it to the SCF using the CallInformationReport operation.   |
| Cancel (CAN)                     | Used to cancel all active requests for EventReportBCSM, ApplyChargingReport and CallInformationReport or used to cancel a user interaction started with PlayAnnouncement or PromptAndCollectUserInformation. |
| Connect (CON)                    | Used to modify parameters for the call, e.g. target number, before the call is further processed.  |
| Connect to Resource (CTR)        | Used to connect a call from the gsmSSF to an MRFC or an MRFP. After successful connection to the media resources, the interaction with the caller can take   |



|  |   |
|--|---|
|  | place.  |
| Continue (CUE)                           | Used to indicate that call processing shall continue with the available parameters for the call.  |
| Disconnect Forward Connection (DFC)      | Used to explicitly disconnect a connection to a media resource (gsmSRF) established previously with a ConnectToResource operation.                                      |
| Furnish Charging Information (FCI)       | Used to send charge related information to a call detail record.  |
| Play Announcement (PA)                   | Used to play announcements to the calling party.  |
| Prompt And Collect User Information (PC) | Used to interact with the calling party in order to collect information.  |
| Release Call (RC)                        | Used to tear down an existing call at any phase of the call for all parties involved in the call.   |
| Request Report BCSM Event (RRB)          | Used to request monitoring for a call-related event (e.g., BCSM events such as busy or no answer), then send a notification back to the SCF when the event is detected. |
| Reset Timer (RT)                         | Used by the gsmSCF to refresh the TSSF application timer, in order to avoid the TSSF time-out at the gsmSSF.  |

*Table 2: Used Operations*

| Used Operations as CAP client  | Description  |
|--------------------------------|--|
| Apply Charging Report (ACR)    | Used to report charging related information as requested by the gsmSCF using the ApplyCharging operation.  |
| Call Information Report (CIRp) | Used to send specific call information for a single call party to the SCF as requested by the SCF in a previous CallInformationRequest operation.  |
| Event Report BCSM (ERB)        | Used to notify the SCF of a call related event previously requested by the SCF in an RequestReportBCSMEvent operation.   |
| Initial Detection Point (IDP)  | Used to start the interaction with the SCF. This operation that contains information elements that are subscriber specific, MTAS specific and call specific, is sent based on the fact that the subscriber is provisioned with CAPv2 services.<br>Depending on configuration option IDP sending can be triggered by B-number matching function. In this case the SCP address and service key is configured |

|                                   |   |
|-----------------------------------|---|
|                                   | per B-number destination.   |
| Specialized Resource Report (SRR) | Used as the response to a PlayAnnouncement operation when the announcement is finished. |

## 2.4.2

### MTAS SCF

*Table 3: Offered Operations*

| Offered Operations as CAP server | Description  |
|----------------------------------|--|
| InitialDP                        | Received operation from MSC/GMSC SSF for calls from/to ICS User to request SCF for instructions to complete the call in IMS service domain. This operation that contains information elements that are subscriber specific is sent based on the fact that the subscriber is provisioned with CAPv2 services. |

*Table 4: Used Operations in response to InitialDP request*

| Used Operations as CAP server | Description  |
|-------------------------------|--|
| Connect                       | Used to modify the target number, destination routing address set to the IMS domain, for the call before the call is further processed in MSC/GMSC.  |
| Continue                      | Response to MSC/GMSC on InitialDP in the case MTAS SCF cannot obtain a destination routing address, either because of function not administrative available or error, and SCF CAP error handling policy configured to return Continue. |

## 2.5 Encapsulation and Addressing

### 2.5.1 CAP Interface

The protocol on the CAP interface is defined by 3GPP and is described in [1] and [2].

Only a subset of the services is used/offered by MTAS. The subset is described in Table 5 and Table 6.

### 2.5.2 Application context

MTAS uses the Application Context *CAP-v2-gsmSSF-to-gsmSCF-AC*.

## 3 Procedures

### 3.1 MTAS SSF

#### 3.1.1 Overview

The used service is specified by the operations used on the interface. The used service operation is:

*Table 5 Used Operations*

| Service | Operation                         |
|---------|-----------------------------------|
| SCF     | Apply Charging Report (ACR)       |
| SCF     | Call Information Report (CIRp)    |
| SCF     | Event Report BCSM (ERB)           |
| SCF     | Initial Detection Point (IDP)     |
| SCF     | Specialized Resource Report (SRR) |

The offered service is specified by the operations offered on the interface. The offered service operations are:

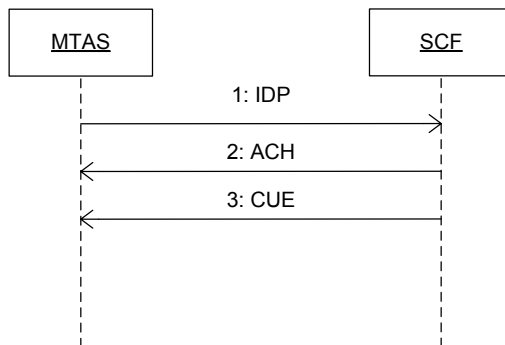
*Table 6 Offered Operations*

| Service | Operation                                |
|---------|--|
| SSF     | Apply Charging (ACH)                     |
| SSF     | Call Information Request (CIRq)          |
| SSF     | Cancel (CAN)                             |
| SSF     | Connect (CON)                            |
| SSF     | Connect to Resource (CTR)                |
| SSF     | Continue (CUE)                           |
| SSF     | Disconnect Forward Connection (DFC)      |
| SSF     | Furnish Charging Information (FCI)       |
| SSF     | Play Announcement (PA)                   |
| SSF     | Prompt And Collect User Information (PC) |
| SSF     | Release Call (RC)                        |
| SSF     | Request Report BCSM Event (RRB)          |
| SSF     | Reset Timer (RT)                         |

#### 3.1.2 Lower Level Procedures

N/A

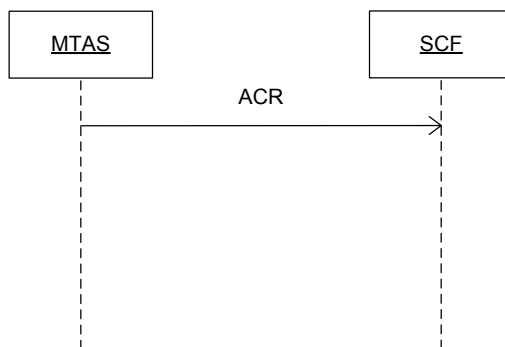
### 3.1.3 Apply Charging (ACH)



*Figure 3 Apply Charging (ACH)*

1. MTAS sends an IDP to start the interaction.
2. The SCF sends APPLY CHARGING to control the call duration.
3. The SCF sends a CONTINUE to indicate that call processing shall continue.

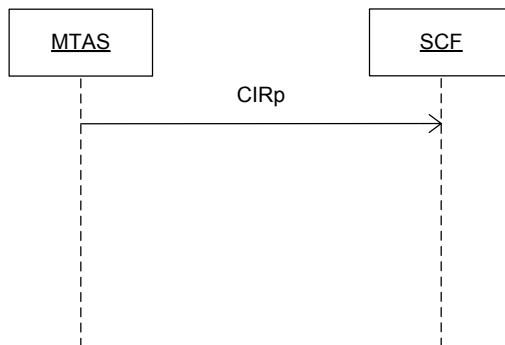
### 3.1.4 Apply Charging Report (ACR)



*Figure 4 Apply Charging Report (ACR)*

An ACR is sent when the time specified by the MaxCallPeriodDuration has elapsed. This operation is only sent if it was preceded by an ACH when the time specified by the MaxCallPeriodDuration has elapsed or when the call is ended. For example as in the sequence in Figure 3.

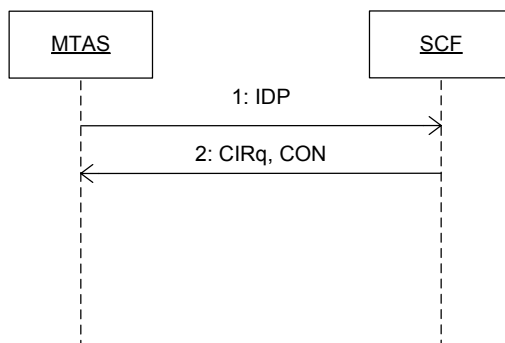
### 3.1.5 Call Information Report (CIRp)



*Figure 5 Call Information Report (CIRp)*

A CIRp is sent when a specific call leg is terminated or when a call setup failed. This operation is only sent if it was preceded by a CIRq that requested the information, for example as in the sequence in Figure 6.

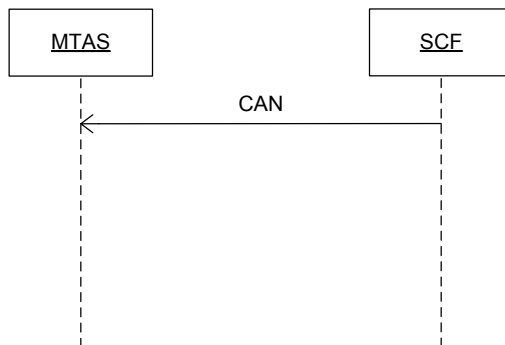
### 3.1.6 Call Information Request (CIRq)



*Figure 6 Call Information Request (CIRq)*

1. MTAS sends an IDP to start the interaction.
2. The SCF sends a CIRq to request call information reports.

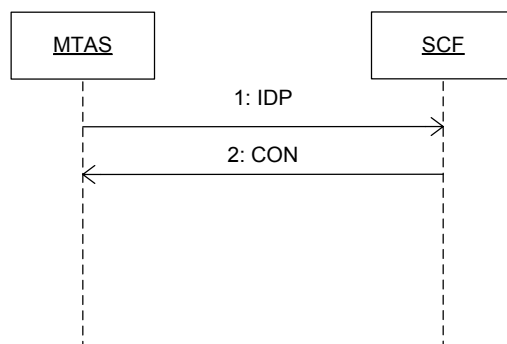
### 3.1.7 Cancel (CAN)



*Figure 7 Cancel (CAN)*

A CAN can be sent by the SCF to cancel outstanding events, reports or user interactions. To have any effect, it must have been preceded by at least one of the following operations: RRB, ACH, CIRq, PA or PC. For example as in the sequence in Figure 3.

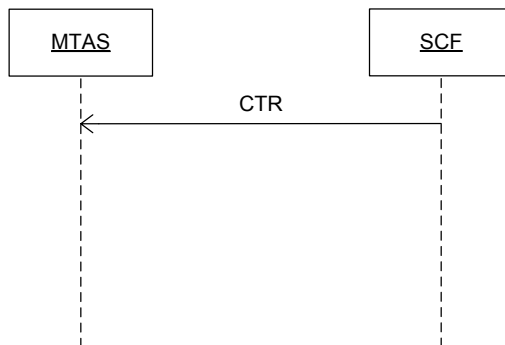
### 3.1.8 Connect (CON)



*Figure 8 Coonnect (CON)*

1. MTAS sends an IDP to start the interaction.
2. The SCF sends a CON which information elements will be used when further processing the call.

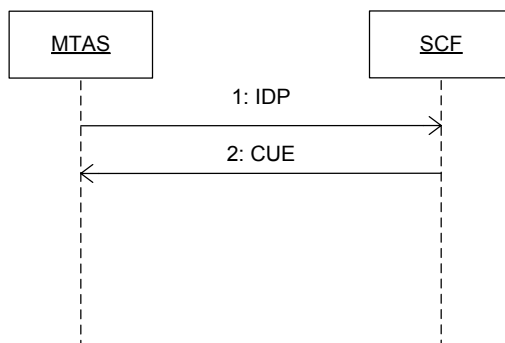
### 3.1.9 Connect to Resource (CTR)



*Figure 9 Connect to Resource (CTR)*

A CTR can be sent by the SCF at the early stage of the call, because MTAS only supports user interaction on early dialogues. It must have been preceded by, for example, the sequence in Figure 14.

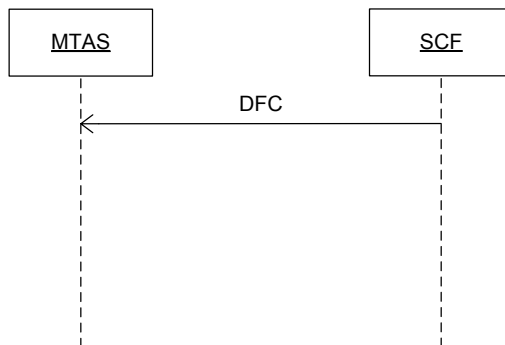
### 3.1.10 Continue (CUE)



*Figure 10 Continue (CUE)*

1. MTAS sends an IDP to start the interaction.
2. The SCF sends a CUE to indicate that call processing shall continue.

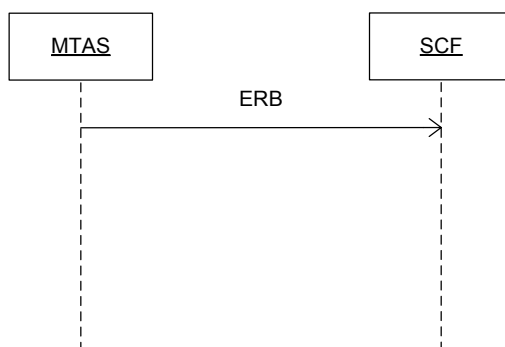
### 3.1.11 Disconnect Forward Connection (DFC)



*Figure 11 Disconnect Forward Connection (DFC)*

A DFC can be sent by the SCF to explicitly disconnect a connection to a media resource established previously with a ConnectToResource operation.. It must have been preceded by, for example, the sequence in Figure 9.

### 3.1.12 Event Report BCSM (ERB)

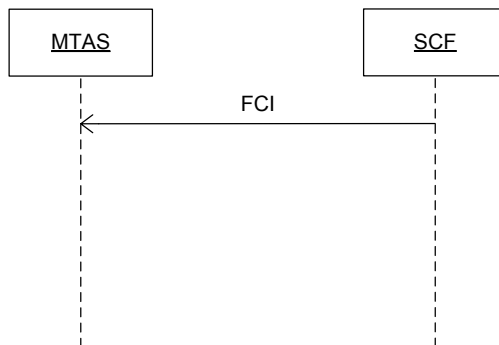


*Figure 12 Event Report BCSM (ERB)*

An ERB is sent when a specific call event occurred. This operation is only sent if it was preceded by an RRB that requested the monitoring for the occurred call event, for example as in the sequence in Figure 18.



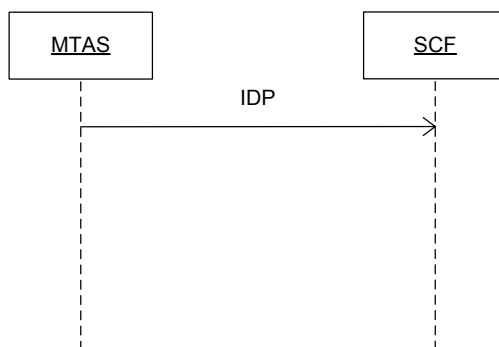
### 3.1.13 Furnish ChargingInformation (FCI)



*Figure 13 Furnish ChargingInformation (FCI)*

A FCI can be sent by the SCF at any point in time during the call. It is preceded, for example, by the sequence in Figure 10.

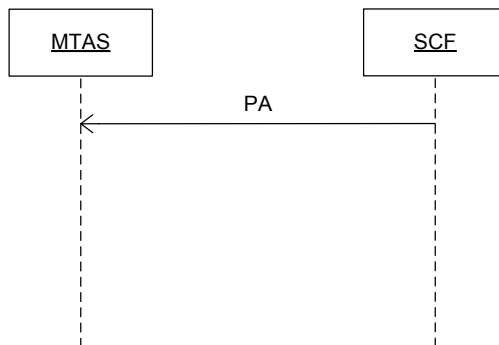
### 3.1.14 Initial Detection Point (IDP)



*Figure 14 Initial Detection Point (IDP)*

An IDP is sent by the SSF every time a user that is provisioned with CAPv2 makes a call attempt. The purpose of the IDP is to establish a control relationship with the SCF.

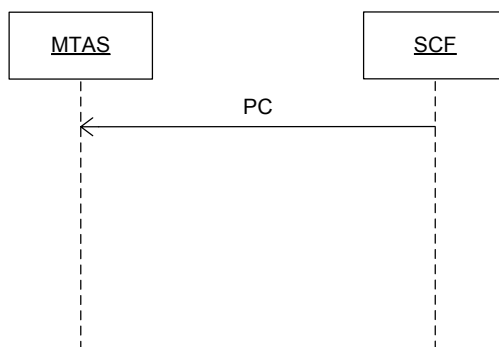
### 3.1.15 Play Announcement (PA)



*Figure 15 Play Announcement (PA)*

A PA can be sent by the SCF during call establishment. It must have been preceded by the sequence in Figure 9.

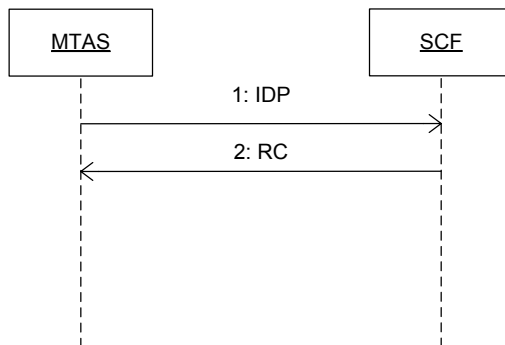
### 3.1.16 Prompt And Collect User Information (PC)



*Figure 16 Prompt And Collect User Information (PC)*

A PC can be sent by the SCF during call establishment. It must have been preceded by the sequence in Figure 9. The collected user input is returned to the SCF as a ReceivedInformation result to this operation.

### 3.1.17 Release Call (RC)

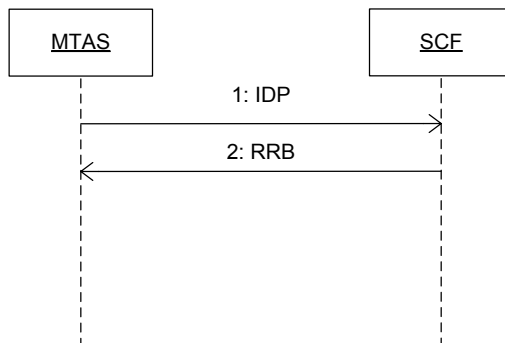


*Figure 17 Release Call (RC)*

A RC can be sent during call establishment as well as when the call has been established.

1. MTAS sends an IDP to start the interaction.
2. The SCF sends an RC to release the call.

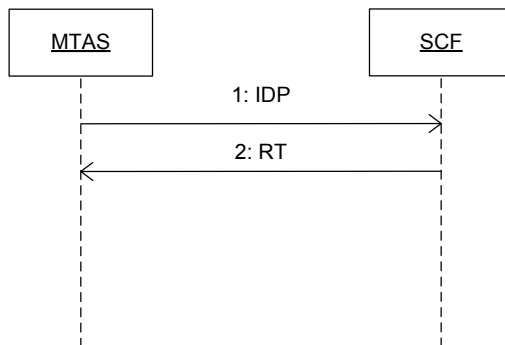
### 3.1.18 Request Report BCSM Event (RRB)



*Figure 18 Request Report BCSM Event (RRB)*

A RRB can be sent by the SCF to request the gsmSSF to monitor for a call-related event. One example is directly after an IDP as the sequence in Figure 18.

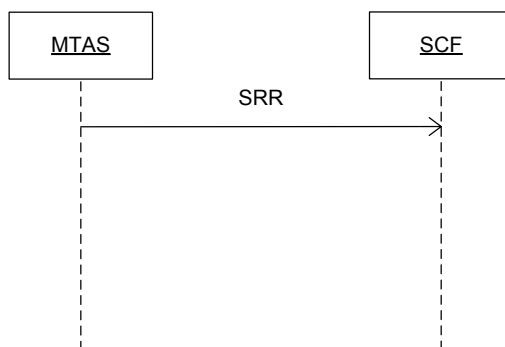
### 3.1.19 Reset Timer (RT)



*Figure 19 Reset Timer (RT)*

A RT can be sent by the SCF directly after an IDP as the sequence in Figure 19 or before a user interaction..

### 3.1.20 Specialized Resource Report (SRR)



*Figure 20 Specialized Resource Report (SRR)*

An SRR is sent by MTAS when an announcement has finished playing. The SRR must have been preceded by a PA as in Figure 15.

## 3.2 MTAS SCF

### 3.2.1 Overview

The offered service is specified by the operations offered on the interface. The offered service operation is:

*Table 7 Offered Operations*

| Service | Operation                     |
|---------|-------------------------------|
| SCF     | Initial Detection Point (IDP) |

The used service is specified by the operations used on the interface. The used service operations are:

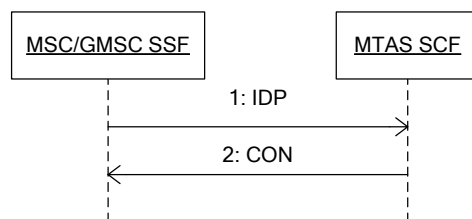
*Table 8 Used Operations*

| Service | Operation      |
|---------|----------------|
| SSF     | Connect (CON)  |
| SSF     | Continue (CUE) |

### 3.2.2 Lower Level Procedures

N/A

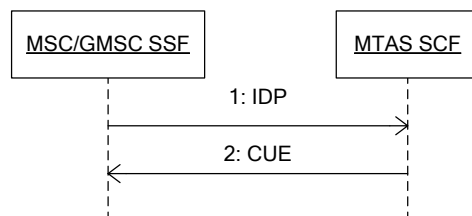
### 3.2.3 Connect (CON)



*Figure 21 Connect*

1. MSC for MO calls or GMSC for MT calls sends an IDP to start the interaction.
2. The MTAS SCF sends a Connect with the destination routing address to the IMS domain (IMRN).

### 3.2.4 Continue (CUE)

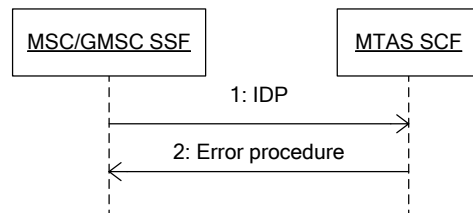


*Figure 22 Continue*

1. MSC for MO calls or GMSC for MT calls sends an IDP to start the interaction.

2. The MTAS SCF cannot fulfill the request, the SCF CAP error handling policy is set to return Continue, and a Continue is sent to indicate that the call processing shall continue in the CS domain.

### 3.2.5 Error procedure



*Figure 23 Error procedure*

1. MSC for MO calls or GMSC for MT calls sends an IDP to start the interaction.
2. The MTAS SCF cannot fulfill the request, the SCF CAP error handling policy is set to return Error:
  - SystemFailure when IMRN not available.
  - TaskFailure if operation other than IDP requested
  - MissingCustomerRecord if requested service not supported by SCF
  - UnexpectedDataValue if calling/called party numbers contains no address, or has wrong format.
  - MissingParameter if IMSI is not present for MO and MT calls or if Location Information is not present for MO calls.

## 4 Information Model

### 4.1 General

This section describes the request that is sent by MTAS and the indications received by MTAS.

## 4.2 SSF Service

### 4.2.1 Requests sent by MTAS

#### 4.2.1.1 Apply Charging Report (ACR)

MTAS sends the following parameters in the ACR:

*Table 9 Apply Charging Report Information Elements*

| Information element name | MO | MF | MT | Description  |
|--------------------------|----|----|----|--|
| Call Result              | M  | M  | M  | This information element, which is further specified in Table 10 contains the charging information to be provided by the gsmSSF. |

*Table 10 Call Result Information Elements*

| Information element name      | MO | MF | MT | Description  |
|-------------------------------|----|----|----|--|
| Time Duration Charging Result | M  | M  | M  | This information element is further described in Table 11. |

*Table 11 Time Duration Charging Result Information Elements*

| Information element name | MO | MF | MT | Description   |
|--------------------------|----|----|----|---|
| Time Information         | M  | M  | M  | This information element always contains Time if No Tariff Switch.  |
| Party To Charge          | M  | M  | M  | This information element is received in the related ApplyCharging operation to correlate the result to the request. This information element is copied from the corresponding information element received in the Apply Charging operation. |
| Call Active              | M  | M  | M  | This information element indicates whether the call is active or not.   |

*Table 12 Time Information Information Elements*

| Information element name | MO | MF | MT | Description   |
|--------------------------|----|----|----|---|
| Time If No Tariff Switch | C  | C  | C  | This information element will be present if no tariff switch has occurred since the detection of Answer for the connection to the Called Party, the Temporary Connection, or the SRF connection, otherwise it will be absent. It contains the elapsed time call was answered. |
| Time If Tariff Switch    | C  | C  | C  | This information element will be present if a tariff switch has occurred since the detection of Answer for the connection to the Called Party, the Temporary Connection, or the SRF connection, otherwise it will be absent.<br><br>Not sent by MTAS.                         |

#### 4.2.1.2 Call Information Report (CIRp)

*Table 13 CIRp Information Elements*

| Information element name   | MO | MF | MT | Description   |
|----------------------------|----|----|----|---|
| Requested Information List | M  | M  | M  | This information element, further specified in Table 25, specifies a list of Requested information Values which are requested.  |
| Leg ID                     | M  | M  | M  | This information element indicates the party in the call for which information shall be collected. When absent, it indicates the 'outgoing' leg created with Connect or Continue. |

#### 4.2.1.3 Event Report BCSM (ERB)

MTAS sends the following parameters in the ERB:

*Table 14 ERB Information Elements*

| Information element name        | MO | MF | MT | Description  |
|---------------------------------|----|----|----|--|
| Event type BCSM                 | M  | M  | M  | This information element specifies the type of event that is reported.   |
| Event Specific Information BCSM | C  | C  | C  | This information element indicates the call related information specific to the event.<br><br>See [7] , section 2.1, for encoding. |
| Leg ID                          | M  | M  | M  | This information element indicates the party in the call for which the event is reported.  |
| Misc Call Info                  | M  | M  | M  | This information element indicates the DP type.  |



The Event Specific Information BCSM information element contains the following cause information (see [8]) for the following detections points:

- The possible failure causes sent by MTAS are listed in Table 15

*Table 15 SIP to DSS1 cause code mapping*

| <b>SIP Error</b>               | <b>Cause Number</b>                                 |
|--------------------------------|---|
| 400 Bad request                | 111 (Protocol error, unspecified)                   |
| 402 Payment required           | 127 (Interworking, unspecified)                     |
| 403 Forbidden                  | 79 (Service or option not implemented, unspecified) |
| 404 Not found                  | 1 (Unallocated (unassigned) number)                 |
| 405 Method not allowed         | 127 (Interworking, unspecified)                     |
| 406 Not acceptable             | 127 (Interworking, unspecified)                     |
| 408 Request Timeout            | 18 (No user responding)                             |
| 410 Gone                       | 22 (Number changed)                                 |
| 413 Request entity too long    | 127 (Interworking, unspecified)                     |
| 414 Request URI (URL) too long | 111 (Protocol error, unspecified)                   |
| 415 Unsupported media type     | 127 (Interworking, unspecified)                     |
| 416 Unsupported URI scheme     | 111 (Protocol error, unspecified)                   |
| 417 Unknown Resource-Priority  | 79 (Service or option not implemented, unspecified) |
| 420 Bad extension              | 111 (Protocol error, unspecified)                   |
| 421 Extension required         | 111 (Protocol error, unspecified)                   |
| 422 Session Interval Too Small | 31 (Normal, unspecified)                            |
| 423 Interval Too Brief         | 127 (Interworking, unspecified)                     |
| 440 Max-Breadth Exceeded       | 127 (Interworking, unspecified)                     |
| 480 Temporarily Unavailable    | 19 (No answer from user)                            |
| 481 Call leg does not exist    | 127 (Interworking, unspecified)                     |
| 482 Loop detected              | 127 (Interworking, unspecified)                     |

|                             |   |
|-----------------------------|---|
| 483 Too many hops           | 25 (Exchange routing error)                         |
| 484 Address incomplete      | 28 (Invalid number format (address incomplete))     |
| 485 Address ambiguous       | 1 (Unallocated (unassigned) number)                 |
| 486 Busy here               | 17 (User busy)                                      |
| 488 Not acceptable here     | 50 (Requested facility not subscribed)              |
| 500 Internal server error   | 127 (Interworking, unspecified)                     |
| 501 Not implemented         | 79 (Service or option not implemented, unspecified) |
| 502 Bad gateway             | 27 (Destination out of order)                       |
| 503 Service unavailable     | 127 (Interworking, unspecified)                     |
| 504 Gateway timeout         | 102 (Recovery on timer expiry)                      |
| 505 Version not implemented | 127 (Interworking, unspecified)                     |
| 580 Precondition Failed     | 127 (Interworking, unspecified)                     |
| 600 Busy everywhere         | 17 (User busy)                                      |
| 604 Does not exist anywhere | 2 (No route to specified transit network)           |
| 606 Not acceptable          | 88 (Incompatible destination)                       |

- In case O\_Disconnect is reported, no release cause is sent by MTAS.
- If the T\_Busy event was triggered by a call forwarding in the terminating MTAS, this is indicated in the event report.
- In case the T\_No\_Answer event was triggered by call forwarding in the terminating MTAS, this is indicated in the event report.
- In case T\_Disconnect is reported, no release cause is sent by MTAS.

#### 4.2.1.4 Initial Detection Point (IDP)

MTAS sends the following parameters in the IDP:

Table 16 IDP Information Elements

| Information element name        | MO | MF | MT | Comment  |
|---------------------------------|----|----|----|--|
| Additional Calling Party Number | -  | C  | C  | <p>The calling party number provided by the access signalling system of the calling user. This is typically a VPN number or a short number that will be presented on the called users terminal.</p> <p>Not sent by MTAS.</p>   |
| Bearer Capability               | M  | C  | C  | <p>This IE indicates the type of the bearer capability connection to the user.</p> <p>Sent by MTAS in the MO case.</p> <p>The value of this information element is always “speech”.</p> <p>See [6], section 4.5.5 for encoding.</p>  |
| Called Party Number             | -  | M  | M  | <p>This IE contains the number used to identify the called party in the forward direction.</p> <p>Sent by MTAS in the MF and MT case. This information element is derived from the Request-URI header.</p> <p>When the Request-URI header with embedded SIP URI doesn't contain “user=phone” parameter, then the user part is treat as VPN number, i.e. all digits in user part of the SIP URI are taken.</p> <p>MTAS always uses the Nature of Address Indicator (NAI) value “international number” and the Numbering Plan Identification is always E.164.</p> <p>See [3], section 3.9 for encoding.</p>  |
| Called Party BCD Number         | M  | -  | -  | <p>This IE contains the number used to identify the called party in the forward direction. The number contained in this IE shall be identical to the number received over the access network. It may e.g. include service selection information, such as * and # digits, or carrier selection information dialled by the subscriber.</p> <p>Sent by MTAS in the MO case. This information element is derived from the Request-URI header.</p> <p>If the number from Request-URI is an international number with leading “+” sign, for example Request-URI “<a href="#">+4424225566@bt.co.uk; user=phone</a>”, MTAS uses the Nature of Type of Number (TON) value “international number”; otherwise MTAS always uses value “unknown”. And the Numbering Plan Identification is always E.164.</p> <p>See [1] for the included fields and [4], section 10.5.4.7 for encoding.</p> |

|                         |   |   |   |   |
|-------------------------|---|---|---|---|
| Calling Party Number    | M | C | C | <p>This IE carries the calling party number to identify the calling party or the origin of the call.</p> <p>Sent by MTAS in the MO case. This information element is derived from the P-Asserted-Identity header.</p> <p>MTAS always uses the Nature of Address Indicator (NAI) value “international number” and the Numbering Plan Indicator is always E.164. MTAS always sets the Screening Indicator parameter field to “reserved”.</p> <p>For the Address Presentation Restricted Indicator parameter field, two values are possible: “presentation allowed” and “presentation restricted”. The value that is sent by MTAS depends on the SIP Privacy header. For the mapping, see [9]. See [3], section 3.10 for encoding.</p>     |
| Calling Partys Category | M | C | C | <p>Indicates the type of calling party (e.g., operator, pay phone, ordinary subscriber).</p> <p>Sent by MTAS in the MO case. This information element contains the provisioned value for the served user, if any. If no provisioned value exists, MTAS sends the value “ordinary calling subscriber”.</p> <p>See [3], section 3.10 for encoding.</p>  |
| Call Reference Number   | M | M | M | <p>This IE may be used by the gsmSCF for inclusion in a network optional gsmSCF call record. It has to be coupled with the identity of the MSC which allocated it in order to define unambiguously the identity of the call. For MO calls, the call reference number is set by the serving VMSC and included in the MO call record. For MT calls, the call reference number is set by the GMSC and included in the RCF call record in the GMSC and in the MT call record in the terminating MSC. For CF calls, the call reference number is set by the GMSC and included in the CF record in the forwarding MSC.</p> <p>Sent by MTAS in the MO, MF and MT case. This information element contains a unique value generated by MTAS.</p> |
| Event Type BCSM         | M | M | M | <p>This IE indicates the armed BCSM DP event (i.e., Collected_Info and Terminating_Attempt_Authorised), resulting in the Initial DP IF.</p> <p>Sent by MTAS in the MO, MF and MT case. This information element contains one of the possible values specified in [1].</p>   |
| Ext-Basic Service Code  | C | C | C | <p>This IE indicates the type of basic service i.e., teleservice or bearer service.</p>   |

|                          |   |   |   |  |
|--------------------------|---|---|---|--|
|                          |   |   |   | Not sent by MTAS.  |
| High Layer Compatibility | C | C | C | <p>This IE indicates the type of the high layer compatibility, which will be used to determine the ISDN-teleservice of a connected ISDN terminal.</p> <p>Not sent by MTAS.</p>   |
| IMSI                     | M | M | M | <p>This IE identifies the mobile subscriber.</p> <p>Sent by MTAS in the MO, MF and MT case.<br/>MTAS fetch IMSI according to the following order:</p> <ol style="list-style-type: none"> <li>1. IMPI from cached registration data. If found, then MTAS derives IMSI from IMPI when the IMPI is in the following format:<br/>&lt;IMSI&gt;@ims.mnc&lt;MNC&gt;.mcc&lt;MCC&gt;.3gppnetwork.org</li> <li>2. Provisioned IMSI in the Northbound Call Control (NCC) part of subscriber's service data when CM attribute 'mtasNccImsiBehavior' is set to 3 (IMSI is required in NCC service data or UCD).</li> <li>3. Provisioned IMSI in the Subscription element in User Common Data part of subscriber's service data.</li> </ol> <p>If MTAS cannot get IMSI in the above 3 steps, it will check the default call handling in the NCC transparent data and either continue the call without CAMEL interaction i.e. without sending the IDP or reject the call by sending a 403 response with reason "IMSI not available".</p> <p>The format used is E.212.</p> |
| IP SSP Capabilities      | C | C | C | <p>This IE indicates which SRF resources are supported within the gsmSSF and are available. If this IE is absent, this indicates that no gsmSRF is attached and available.</p> <p>MTAS supports acting as a SRF with the following resources available:</p> <ul style="list-style-type: none"> <li>• IPRoutingAddress not supported</li> <li>• VoiceBack supported</li> <li>• VoiceInformation not supported, via speech recognition</li> <li>• VoiceInformation not supported, via voice recognition</li> <li>• Generation of voice announcements from Text not supported</li> </ul> <p>See [1] for encoding.</p>   |
| Location Information     | M | - | C | <p>This IE is described in Table 18 and relates to the location of the served user.</p> <p>For MO case the network provided P-Access-Network-</p>  |

|                 |   |   |   |   |
|-----------------|---|---|---|---|
|                 |   |   |   | <p>Info (PANI) header of the incoming INVITE is used for populating this IE.</p> <ul style="list-style-type: none"> <li>- When no network-provided PANI header is available and when Network Provided Location Information (NPLI) retrieval is enabled on originating side in the MMTel AS, this IE will be populated with the results fetched from the HSS.</li> <li>- When user is on an unsupported access, MTAS will look at the default call handling of Northbound Call Control (NCC) transparent data: <ul style="list-style-type: none"> <li>o When default call handling set to “continue”, continues the call without CAMEL interaction, i.e. no IDP will be sent</li> <li>o When default call handling set to “release”, reject the call with the reason “Location Information not available”.</li> </ul> </li> </ul> <p>For MT case this IE is populated when NPLI retrieval is enabled to be triggered on INVITE for the terminating side in the MMTel AS and the user is on a supported access.</p> <p>For more information regarding NPLI retrieval in MTAS see [9].</p>   |
| Location Number | M | C | C | <p>For mobile originated calls this IE represents the location of the calling party. For all other call scenarios this IE contains the location number received in incoming SIP signalling.</p> <p>Sent by MTAS in the MO case.</p> <ul style="list-style-type: none"> <li>- If the P-Access-Network-Info (PANI) header of the incoming INVITE is available, the location number is fetched by database lookup from CM object CommonDataAccTypeLocNum using the PANI as key.</li> <li>- If no P-Access-Network-Info header is available, and when Network Provided Location Information (NPLI) retrieval is enabled on originating side <ul style="list-style-type: none"> <li>o For CS user, the location number will be fetched from HSS directly</li> <li>o For other supported users, the location information will be fetched from HSS, and the location number will be queried from the CommonDataAccTypeLocNum using the location information</li> </ul> </li> <li>- If location number cannot be fetched in above steps, this element will have the same value as the Calling Party Number.</li> </ul> <p>In either case, the Address Presentation Restricted</p> |

|                          |   |   |   |   |
|--------------------------|---|---|---|---|
|                          |   |   |   | <p>Indicator parameter field will always have the same value ("presentation allowed" or "presentation restricted") as the Address Presentation Restricted Indicator parameter field in Calling Party Number element.</p> <p>MTAS always sets the Screening Indicator parameter field to "network provided".</p> <p>See [3], section 3.30 for encoding.</p> <p>See [9] for NPLI retrieval from the HSS in MTAS.</p>  |
| MSC Address              | M | M | M | <p>For MO calls, the MSC Address carries the international E.164 address of the serving VMSC.</p> <p>For MT calls, the MSC Address carries the international E.164 address of the GMSC.</p> <p>For MF calls, the MSC Address carries the international E.164 address of the forwarding MSC.</p> <p>Sent by MTAS in the MO, MF and MT case. This information element contains the configured Global Title.</p> <p>See [5], section 17.7.8, for encoding.</p>   |
| GMSC Address             | - | M | - | <p>For MF calls, the GMSC Address carries the international E.164 address of the GMSC.</p> <p>Sent by MTAS in the MF case. This information element contains the configured Global Title.</p> <p>See [5], section 17.7.8, for encoding.</p>   |
| NA Carrier Information   | C | C | C | <p>The content of this IE is described in the next table.</p> <p>The IE may normally be sent when the VPLMN and the HPLMN of the subscriber are both North American.</p> <p>For MO calls, this IE shall contain any carrier that was dialled by the calling subscriber. If no carrier was dialled, the IE shall contain the calling subscriber's subscribed carrier.</p> <p>For MT calls, the IE shall contain the carrier subscribed to by the called subscriber. For MF calls, the IE shall contain the carrier subscribed to by the forwarding subscriber.</p> <p>Not sent by MTAS</p> |
| Original Called Party ID | - | C | C | <p>This IE carries the dialled digits if the call has met call forwarding on the route to the gsmSSF.</p> <p>This IE is not populated for the diverted call leg i.e. B-C, only for call leg A-B on the terminating MTAS.</p> <p>Populated with the first entry in the History-Info header when available in the incoming INVITE and when the entry is a phone-number.</p>   |

|                      |   |   |   |   |
|----------------------|---|---|---|---|
|                      |   |   |   | <p>When MMTel CDIV CFU is activated and there is no History-Info header in the incoming INVITE, this entry is populated with the address/phone-number of the terminating user i.e. B (served user), who will do a diversion to C since CFU is activated in MMTel CDIV.</p> <p>Nature of Address Indicator is set to national (significant) when the number in History-Info has no “+” prefix.</p> <p>Number Plan Indicator is always set to ISDN telephony numbering plan by MTAS.</p> <p>Address Presentation Restricted Indication is based on the priv-value parameter of the target or as second option the Privacy header field.</p> <ul style="list-style-type: none"> <li>- Is set to “Presentation restricted” if privacy is “history”, “session” or “header”.</li> <li>- Otherwise set to “Presentation allowed” when privacy is either absent or set to “none”.</li> </ul>  |
| Redirecting Party ID | - | C | C | <p>This IE indicates the directory number the call was redirected from.</p> <p>The service designer shall note that this parameter may not be available if the MF case is initiated with the Connect operation to a T-BCSM without Redirecting Party ID and no redirecting information in History-Info header.</p> <p>When the History-Info header with embedded SIP URI doesn't contain “user=phone” parameter then mapping to Redirecting Party number is not performed, the parameter is not available.</p> <p>Populated with the second last entry in the History-Info header with cause-parameter when there is a History-Info header in the incoming INVITE and when the entry is a phone-number. When only two entries is present in the History-Info header this IE will be populated with the first entry i.e. same as Original Called Party ID.</p> <p>When MMTel CDIV CFU is activated this IE is populated with the address/phone-number of the terminating user i.e. B (served user).</p> <p>Nature of Address Indicator is set to national (significant) when the number in History-Info has no “+” prefix.</p> <p>Number Plan Indicator is always set to ISDN telephony numbering plan by MTAS.</p> <p>Address Presentation Restricted Indication is based on the priv-value of the target or as second option the</p> |



|                         |   |   |   |  |
|-------------------------|---|---|---|--|
|                         |   |   |   | <p>Privacy header field.</p> <ul style="list-style-type: none"> <li>- Is set to "Presentation restricted" if privacy is "history", "session" or "header".</li> <li>- Otherwise set to "Presentation allowed" when privacy is either absent or set to "none".</li> </ul>  |
| Redirection Information | - | M | C | <p>It contains forwarding related information, such as redirection counter.</p> <p>The service designer shall note that this parameter may not be available if the MF case is initiated with the Connect operation to a T-BCSM without Redirection Information and no redirecting information in History-Info header.</p> <p>Redirection Indicator is based on the priv-value of the used entry in the History-Info header or the Privacy header when priv-value is not available for the entry.</p> <ul style="list-style-type: none"> <li>- Is set to "Call Diversion" when priv-value and Privacy header are absent or set to "none".</li> <li>- Otherwise set to "Call diversion, all redirection information presentation restricted" when "history", "session" or "header" is used.</li> </ul> <p>Original Redirection Reason is set to unknown.</p> <p>Redirection Counter is set to the number of History-Info entries containing a cause-parameter with one of the values for Redirection reasons listed below. When number of redirection in SIP exceeds the maximum parameter value in CAP, it is set to maximum value of 5.</p> <p>Redirection reason is taken from the cause-parameter of the used entry from the History-Info header.</p> <p>404=Unknown/not available<br/> 302=Unconditional<br/> 486=User busy<br/> 408=No reply<br/> 480=Deflection immediate response<br/> 487=Deflection during alerting<br/> 503=Mobile subscriber not reachable</p> <p>When MMTel CDIV Call Forwarding Unconditional (CFU) is activated the Redirection reason is set to "Unconditional".</p> |
| Service Key             | M | M | M | <p>This IE identifies for the gsmSCF the requested set of one or more CAMEL services. It is used to address the correct application/SLP within the gsmSCF.</p> <p>Sent by MTAS in the MO, MF and MT case. This information element contains the service key provisioned for this user. If the IDP is triggered by B-Number matching function, the IE contains the service key</p>  |

|                        |   |   |   |  |
|------------------------|---|---|---|--|
|                        |   |   |   | configured in CM mtasNccBNumberList per B-number destination.  |
| Subscriber State       | - | - | C | <p>This IE indicates the status of the MS. The states are:</p> <ul style="list-style-type: none"> <li>- CAMELBusy: The MS is engaged on a transaction for a mobile originating or terminated circuit-switched call.</li> <li>- NetworkDeterminedNotReachable: The network can determine from its internal data that the MS is not reachable.</li> <li>- AssumedIdle: The state of the MS is neither "CAMELBusy" nor "NetworkDeterminedNotReachable".</li> <li>- Not provided from VLR.</li> </ul> <p>Not sent by MTAS.</p> |
| Time And Timezone      | M | M | M | <p>This IE contains the time that the gsmSSF was triggered, and the time zone the gsmSSF resides in.</p> <p>Sent by MTAS in the MO, MF and MT case.</p> <p>Time and time zone are local to MTAS.</p>   |
| GSM Forwarding Pending | - | - | C | <p>This parameter indicates that a forwarded-to-number was received and the call will be forwarded due to GSM supplementary service call forwarding in the GMSC.</p> <p>Not sent by MTAS.</p>  |

M=Mandatory(The IE shall always be sent), C=Conditional(The IE shall be sent, if available)

Table 17 Location Information elements

| Location Information element name | MO | MF | MT | Comment  |
|-----------------------------------|----|----|----|--|
| Location Number                   | -  | -  | C  | <p>For a definition of this information element, see [3]. Shall be present if it can be derived from the stored cell global identity or location area identity; otherwise shall be absent. The mapping from cell ID and location area to location number is network-specific.</p> <p>Sent by MTAS for MT case:</p> <ul style="list-style-type: none"> <li>- When the Network Provided Location Information (NPLI) request towards the HSS for CS user, the location number will be fetched from HSS directly.</li> <li>- For other supported users, MTAS will query the Location Number from the configuration CommonDataAccTypeLocNum with Location Information fetched from HSS.</li> </ul> <p>See [9] for NPLI retrieval in MTAS.</p>   |
| CellIdOrLAI                       | M  | -  | C  | <p>Cell global identity of the cell or Location Area identity in which the MS is currently in radio contact or in which the MS was last in radio contact. Shall be present if the subscriber record is marked as confirmed by radio contact; otherwise shall be absent.</p> <p>If CAMEL phase 1 or 2, or MAP pre-R99 is used in a 3G radio access of R99 or later network element then this IE may contain the 3G Service Area Identity (SAI). The encoding of SAI is identical to the Cell Global ID. For a 3G radio access or a 4G radio access where the PANI contains an UMTS cell id, the cell id is cut down to fit into this information element.</p> <p>Sent by MTAS in the MO and MT case.</p> <p>For MO case:</p> <ul style="list-style-type: none"> <li>- When the P-Access-Network-Info (PANI) header is network provided, this information element is derived from the PANI header of the incoming INVITE, no query will be done if Network Provided Location Information (NPLI) retrieval is enabled.</li> <li>- When no network provided PANI header is available and NPLI retrieval is enabled for the MMTel AS for originating side, Location Information will be fetched from HSS.</li> <li>- When this IE cannot be populated MTAS will check the default call handling in Northbound Call Control (NCC) transparent data: <ul style="list-style-type: none"> <li>o When default call handling set to "continue", continues the call without CAMEL</li> </ul> </li> </ul> |

|                          |   |   |   |   |
|--------------------------|---|---|---|---|
|                          |   |   |   | <p>interaction, i.e. no IDP will be sent</p> <ul style="list-style-type: none"> <li>○ When default call handling set to “release”, reject the call with the reason “Location Information not available”.</li> </ul> <p>For MT case this is only populated when NPLI retrieval triggering on INVITE is enabled for the terminating side of MMTEL AS.</p> <p>CellIdFixedLength is selected when cell global identification is received in PANI header or fetched from HSS.</p> <ul style="list-style-type: none"> <li>- (2G) GERAN access, &lt;MCC&gt;&lt;MNC&gt;&lt;LAC&gt;&lt;CI&gt;, is fully supported in the CellIdFixedLength structure for example P-Access-Network-Info: 3GPP-GERAN;cgi-3GPP=”24001A123B123”, ”network-provided”.</li> <li>- (3G) UTRAN access, &lt;MCC&gt;&lt;MNC&gt;&lt;LAC&gt;&lt;UCI&gt;, does not fit the CellIdFixedLength structure and only the first four digits of the UCI are sent, for example: P-Access-Network-Info:3GPP-UTRAN;utran-cell-id-3gpp=”24001A123B123456”, ”network-provided”, “456” will not be sent.</li> <li>- (4G) E-UTRAN access, &lt;MCC&gt;&lt;MNC&gt;&lt;TAC&gt;&lt;ECI&gt;, does not fit the CellIdFixedLength structure and only the first four digits of the ECI are sent, for example: P-Access-Network-Info:3GPP-E-UTRAN;utran-cell-id-3gpp=”24001A123B123456”, ”network-provided”, “456” will not be sent.</li> </ul> <p>LAIFixedLength is selected when location area identification is received in PANI header or fetched from HSS.</p> <ul style="list-style-type: none"> <li>- (3G) UTRAN based on service area id, &lt;MCC&gt;&lt;MNC&gt;&lt;LAC&gt;&lt;SAC&gt;, is fully supported in the LAIFixedLength structure but the SAC will not be encoded in the structure, for example P-Access-Network-Info:3GPP-UTRAN;utran-sai-3gpp=”24001A123B123”, ”network-provided”, “B123” will not be sent.</li> </ul> <p><b>MNC</b></p> <p>For both LAIFixedLength and CellIdFixedLength a two digit MNC is only possible to encode in the element structure. Therefore MTAS will remove the third digit in the MNC before encoding it if the MNC is three digits. See [5], section 17.7.1 for encoding.</p> |
| Geographical Information | C | - | C | For a definition of this information element, see GSM   |

|                             |   |   |   |   |
|-----------------------------|---|---|---|---|
|                             |   |   |   | <p>03.32 (Universal Geographical Area Description). Shall be present if it can be derived from the stored cell global identity or location area identity; otherwise shall be absent.</p> <p>Sent by MTAS for MO and MT cases when NPLI retrieval is enabled and the result returned from HSS contains the Geographical Information.</p> <p>Only the description of an ellipsoid point with uncertainty circle is allowed to be used for CAPv2.</p>  |
| Age Of Location Information | M | - | C | <p>Measured in minutes. Shall be present if available in the network; otherwise shall be absent.</p> <p>Sent on the MO and MT case.</p> <p>MO case:</p> <ul style="list-style-type: none"> <li>- When a network provided PANI header is available in incoming INVITE then this IE is set to 32767, since MTAS does not know the age of the location information and therefore uses the maximum value of this element.</li> <li>- When Location Information is fetched from HSS for the CS access and Age Of Location element is present in the response from HSS, then this value is used to populate this IE.</li> <li>- When Location Information is fetched from HSS for other domains than CS or when CS does not contain Age of Location Information element this IE is set to 0, since the Location Information on the HSS is updated when the subscriber initiates the call i.e. INVITE is sent.</li> </ul> <p>MT case:</p> <ul style="list-style-type: none"> <li>- When Location Information is fetched from HSS for the CS access and Age Of Location element is present in the response from HSS, then this value is used to populate this IE.</li> <li>- When active location retrieval is configured on MMTel AS and when Location Information is fetched from HSS for other domains than CS or when CS does not contain Age of Location Information element this IE is set to 0, since the terminal has been paged in order to retrieve accurate location.</li> <li>- When active location retrieval is not configured on MMTel AS and when Location Information is fetched from HSS for other domains than CS or when CS does not contain Age of Location Information element this IE is set to 32767(maximum value of this element), since the</li> </ul> |

|            |   |   |   |   |
|------------|---|---|---|---|
|            |   |   |   | terminal has not been paged and the age of location is unknown for MTAS.  |
| VLR number | M | - | C | <p>E.164 number which identifies the VLR (see GSM 03.03). Sent by MTAS for MO and MT case:</p> <p>MO case:</p> <ul style="list-style-type: none"> <li>- When Location Information is fetched from the HSS for the CS access this IE is set to the VLR-number when received in the result from the HSS.</li> <li>- When a network provided PANI header is available in the incoming INVITE and Access Type NOT starts with "IEEE-802.11", this IE is encoded as unknown and IDP is sent.</li> <li>- When Location Information is fetched from the HSS no VLR-number is received in the result, this IE is encoded as unknown and IDP is sent.</li> <li>- When a PANI header is available in the incoming INVITE and Access Type starts with "IEEE-802.11", this IE is populated with configured value of CM attribute mtasNccVlrAddressForWiFi.</li> </ul> <p>MT case:</p> <ul style="list-style-type: none"> <li>- When Location Information is fetched from the HSS for the CS access this IE is set to the VLR-number when received in the result from the HSS.</li> <li>- In all other cases this IE is not set for the MT case and IDP is sent.</li> </ul> <p>This IE encoded as unknown:<br/>The Nature of Address Indicator is set to 000 (unknown).<br/>The Numbering Plan Indicator is set as 0000 (unknown).<br/>The Address is encoded as TBCD:00000000.</p> <p>This IE is encoded as configure value:<br/>The Nature of Address Indicator is set to 000 (unknown).<br/>The Numbering Plan Indicator is set to: 0000 (unknown).<br/>The Address is encoded as TBCD: Address digits as configured by CM mtasNccVlrAddressForWiFi, like "11111111".</p> |

M=Mandatory(The IE shall always be sent), C=Conditional(The IE shall be sent, if available)

#### 4.2.1.5 Specialized Resource Report (SRR)

This indication has no information elements.

## 4.2.2 Indications received by MTAS

### 4.2.2.1 Apply Charging (ACH)

*Table 18 ACH Information Elements*

| Information element name             | MO | MF | MT | Description  |
|--------------------------------------|----|----|----|--|
| ACH Billing Charging Characteristics | M  | M  | M  | This information element, which is further described in Table 20, specifies the charging related information to be provided by MTAS and the conditions on which this information has to be provided back to the gsmSCF.<br><br>Used by MTAS. |
| Party To Charge                      | M  | M  | M  | This information element shall be reflected in the corresponding information element of the Apply Charging Report operation. This information element has no effect on the charging procedures in the MTAS<br><br>Used by MTAS..             |

*Table 19 ACh Billing Charging Characteristics Information Elements*

| Information element name | MO | MF | MT | Description  |
|--------------------------|----|----|----|--|
| Time Duration Charging   | M  | M  | M  | This information element is described in Table 21. |

*Table 20 Time Duration Charging Information Elements*

| Information element name     | MO | MF | MT | Description   |
|------------------------------|----|----|----|---|
| Max Call Period Duration     | M  | M  | M  | This information element indicates the maximum call period duration timer. This timer specifies when the APPLY CHARGIN REPORT request shall be sent to the SCF.<br><br>Specified in 100 millisecond units.  |
| Tariff Switch Interval       | O  | O  | O  | This information element indicates the tariff switch time until the next tariff switch applies.<br><br>Not used by MTAS.  |
| Release If Duration Exceeded | O  | O  | O  | This information element, which is further specified in Table 22, indicates that the call shall be released when the Max call Period Duration expires, with a warning tone if the Play Tone IE is present. The cause used in the release message shall be "normal unspecified".<br><br>If mtasSsfSupportReleaselfDurationExceeded is set to false, the IE is ignored and the call shall be continued. |

*Table 21 Release If Duration Eceeded Information Elements*

| Information element name | MO | MF | MT | Description   |
|--------------------------|----|----|----|---|
| Play Tone                | O  | -  | O  | This information element is set if a tone has to be played to the party for whom the BCSM is operating. If present, and CM attribute mtasNccCreditAnnouncementName is configured, this information element indicates that 30 seconds before the Max Call Period Duration timer expires, the configured warning tone is to be played.<br><br>This information element shall be absent if the call is not to be released. |

#### 4.2.2.1.1 Errors sent by MTAS as a response to this operation

The table below lists the errors that are generated by the MTAS application. For errors generated by the stack, for example violation of ASN.1 rules, see [11] for details.

| Error | Reason |
|-------|--------|
|-------|--------|



|                             |  |
|-----------------------------|--|
| MissingParameter            | -  |
| ParameterOutOfRange         | The information element MaxCallPeriodDuration is out of range.   |
| SystemFailure               | The Application Process representing the call addressed by this operation is not available.  |
| TaskRefused                 | -  |
| UnexpectedComponentSequence | This error is sent by MTAS if the operation is received in any other state than "Waiting for Instructions" or "Waiting for End of User Interaction" or "Monitoring". |
| UnexpectedDataValue         | -  |
| UnexpectedParameter         | -  |
| UnknownLegID                | The LegID parameter is out of range.   |

*Table 22 Possible error responses to an ACR*

#### 4.2.2.2 Call Information Request (CIRq)

*Table 23 CIRq Information Elements*

| Information element name        | MO | MF | MT | Description   |
|---------------------------------|----|----|----|---|
| Requested Information Type List | M  | M  | M  | This information element, which is further specified in Table 25 specifies a list of specific items of information which are requested.   |
| Leg ID                          | O  | O  | O  | This information element indicates the party in the call for which information shall be collected. When absent, it indicates the 'outgoing' leg created with Connect or Continue. |

*Table 24 Requested Information Type List Information Elements*

| Information element name    | MO | MF | MT | Description  |
|-----------------------------|----|----|----|--|
| Call Attempt Elapsed Time   | O  | O  | O  | This information element indicates that the Call Attempt Elapsed Time is requested in the Call Information Report. Call Attempt Elapsed Time is the duration between the end of the CAMEL processing initiating call setup (Connect or Continue) and the received SIP 200 OK from the called party side. For the Calling Party, the value of Call Attempt Elapsed Time in the Call Information Report shall be set to 0. |
| Call Stop Time              | O  | O  | O  | This parameter indicates that the Call Stop Time is requested in the Call Information Report. Call Connected Elapsed Time is the time stamp when the SIP BYE is sent or received.  |
| Call Connected Elapsed Time | O  | O  | O  | This parameter indicates that the Call Connected Elapsed Time is requested in the Call Information Report. Call Connected Elapsed Time is the duration between the SIP 200 OK from the called party side and the SIP BYE for this call leg.<br><br>For a Calling Party, it indicates the duration between the sending of InitialDP and the SIP BYE for this call leg.  |
| Release Cause               | O  | O  | O  | This parameter indicates that the Release Cause is requested in the Call Information Report.<br><br>Release Cause is the release cause for the call,   |

#### 4.2.2.2.1 Errors sent by MTAS as a response to this operation

The table below lists the errors that are generated by the MTAS application. For errors generated by the stack, for example violation of ASN.1 rules, see [11] for details.

| Error               | Reason   |
|---------------------|--|
| MissingParameter    | None of the information elements CallAttemptElapsedTime, CallStopTime, CallConnectedElapsedTime or ReleaseCause where present. |
| ParameterOutOfRange | -  |
| RequestedInfoError  | -  |
| SystemFailure       | The Application Process representing the call addressed by this operation is not available.                                    |

|                             |   |
|-----------------------------|---|
| TaskRefused                 | -   |
| UnexpectedComponentSequence | This error is sent by MTAS if the operation is received in any other state than "Waiting for Instructions". |
| UnexpectedDataValue         | -   |
| UnexpectedParameter         | -   |
| UnknownLegID                | -   |

*Table 25 Possible error responses to a CIRq*

#### 4.2.2.3 Cancel (CAN)

*Table 26 CAN Information Elements*

| Information element name | MO | MF | MT | Description   |
|--------------------------|----|----|----|---|
| All Requests/Invoke ID   | M  | M  | M  | <p>If this information element is empty, all active requests for EventReportBCSM, ApplyChargingReport and CallInformationReport will be cancelled.</p> <p>If this information element contains an invoke id, the corresponding invoke id will be cancelled. The cancelling of invoke ids is only applicable to PA and PC.</p> |

##### 4.2.2.3.1 Errors sent by MTAS as a response to this operation

| Error        | Reason   |
|--------------|--|
| CancelFailed | The invoke id is not known to MTAS (unknownOperation). |

*Table 27 Possible error responses to a CAN*

#### 4.2.2.4 Connect (CON)

Table 28 CON Information Elements

| Information element name    | MO | MF | MT | Comment  |
|-----------------------------|----|----|----|--|
| Alerting Pattern            | -  | -  | O  | <p>This parameter indicates the kind of Alerting Pattern to be applied.</p> <p>Not used by MTAS.</p>   |
| Calling Partys Category     | O  | O  | O  | <p>This IE indicates the type of calling party (e.g., operator, pay phone, ordinary subscriber).</p> <p>In the MO case, this element is added to the P-Asserted-Identity if received by MTAS.</p> <p>In the MF case, if this element is received in combination with a new Destination Routing Address (CAMEL initiated diversion), the CPC is added to the History-Info element describing the original target.</p>   |
| Destination Routing Address | M  | M  | M  | <p>This IE contains the called party number towards which the call is to be routed.</p> <p>Used by MTAS in the MO, MF and MT case.</p> <p>MTAS expects this IE to be coded as specified by [3], section 3.9.</p> <p>MTAS supports the following Nature of Address Indicators (NAI) values:</p> <ul style="list-style-type: none"> <li>• Subscriber Number</li> <li>• Unknown</li> <li>• National Number</li> <li>• International Number</li> </ul> <p>If the number is an International Number, MTAS expects the NAI set as "International Number".</p> <p>MTAS only supports the Numbering Plan Identification E.164.</p> <p>Depending on which Detection Point i.e. DP the CON is received in, with a new destination number, MTAS sets the Diversion type i.e. cause-parameter in the History-Info header in the outgoing SIP INVITE, for the applicable entry differently:</p> <ul style="list-style-type: none"> <li>- For the DP Terminating_Attempt_Authorized the diversion type is set to "Unconditional".</li> <li>- For the DP T_No_Answer the diversion type is set to "No Answer".</li> <li>- For the DP T_Busy the diversion type is set to "Busy".</li> </ul> |

|                |   |   |   |  |
|----------------|---|---|---|--|
|                |   |   |   | This element is used as the Request-URI.   |
| Generic Number | O | O | O | <p>This IE contains the generic number. It is used to convey the additional calling party number, which e.g. could be used to modify the calling line ID presented to the called user.</p> <p>Used by MTAS in the MO, MF and MT case.</p> <p>The Generic Number is used in two different ways and which way to use depends on the configuration.</p> <p>When configured to only update display-name. Based on the value of the Privacy header in the INVITE message and the value of Address Presentation Restricted Indicator in Generic Number itself, this element may overwrite the display name part of the From and the P-Asserted-Identity headers in the INVITE message (if a display name was already present) or be included in the From and the P-Asserted-Identity headers in the INVITE message if no display name was present.</p> <p>When configured to update the number and the display-name:</p> <ul style="list-style-type: none"> <li>- All original PAI headers are removed from the handled SIP INVITE event in MTAS. Two new PAI headers are added. The first new PAI header is inserted into the INVITE event as TEL URI. The TEL URI contains the Generic Number prefixed with "+". The second PAI header is inserted into the INVITE event as SIP URI. The SIP URI is constructed such that the user-part contains the Generic Number prefixed with "+", the host part is the served user's home domain taken from the default identity of the user and "user=phone" uri-parameter is attached.</li> <li>- The From header is modified such that the name-addr corresponds to the TEL URI of the first PAI.</li> <li>- Display name is handled the same as configured to only update display-name.</li> </ul> <p>For MT and MF cases the number is only overwritten with the Generic Number in P-Asserted-Identity and From header, when a new destination number is received in CON.</p> <p>Number Qualifier:<br/>MTAS does not check the Number Qualifier but when using the configuration to update both number and display-name of P-Asserted-Identity and From headers,</p> |

|                                 |   |   |   |   |
|---------------------------------|---|---|---|---|
|                                 |   |   |   | <p>“additional calling party number” should be used by the SCP.</p> <p>Nature of Address Indicator:<br/>When the configuration is to update both number and display-name is enabled then “International” is the only Nature of Address Indicator that is supported. Other Nature of Address Indicators will not lead to replacement of the number in the P-Asserted-Identity and From headers, and then only the display-name will be updated. The reason for this is that P-Asserted-Identities are not normalized in MTAS since provisioned to the HSS in global/international format. Then if MTAS takes the Generic Number and adds it to the P-Asserted-Identity the P-Asserted-Identity will contain a non-global number without phone-context i.e. not a valid URI. Even if MTAS calls number normalize it will fail due to missing data and therefore the SCP is expected to use normalized numbers i.e. Nature of Address Indicator should be set to “International”. MTAS adds a “+”-sign to the Generic Number before adding it to the P-Asserted-Identity and From headers to enforce the global format.</p> <p>See [74/1553-AVA 901 09/8, MTAS CAPv2 ] for details regarding interaction with Identity Presentation service in MTAS.</p> |
| NA Carrier Information          | O | O | O | <p>This IE is described in Table 30</p> <p>Not used by MTAS.</p>  |
| NA Originating Line Information | O | O | O | <p>This IE identifies the type of number in the NA Charge Number (e.g. subscriber versus PLMN operator number).</p> <p>Not used by MTAS.</p>  |
| NA Charge Number                | O | O | O | <p>This IE identifies the chargeable number for the usage of a North American carrier.</p> <p>Not used by MTAS.</p>   |
| O-CSI Applicable                | - | - | O | <p>This IE indicates that the O-CSI, if present shall be applied on the outgoing leg.</p>   |
| Original Called Party ID        | O | O | O | <p>This IE carries the dialled digits if the call has met call forwarding on route to the gsmSSF or is forwarded by the gsmSCF.</p> <p>Not used by MTAS.</p> <p>MTAS does not need to use this IE since if there is a History-Info header in the incoming INVITE, the Original Called Party ID is the first entry in the History-Info header. Furthermore, when there is no History-Info header in the incoming INVITE, then the Original Called Party is the served user, when a CON with new</p>  |

|                              |   |   |   |   |
|------------------------------|---|---|---|---|
|                              |   |   |   | destination number is received. MTAS adds the History-Info header where the first entry is set to the served user. History-Info is only applicable for CAMEL diversions i.e. CON received on terminating case.  |
| Redirecting Party ID         | O | O | O | <p>This IE indicates the directory number the call was redirected from.</p> <p>Not used by MTAS.</p> <p>Since the redirecting user is always the served user, i.e. the user that the IDP is sent for and the CON is received for, MTAS does not need to use this entry.</p>   |
| Redirection Information      | O | O | O | <p>This IE contains forwarding related information, such as redirecting counter.</p> <p>The Redirecting Indicator is used by MTAS when new destination number has been received in the CON. It is used to populate the History-Info entry element for the served user i.e. the redirecting party.</p> <p>Redirecting Indicator:<br/>The priv-value of the entry in the History-Info header is set to "history" for the following values and in addition the To header is updated with the diverted target if any of the below restriction is received:</p> <ul style="list-style-type: none"> <li>- Call rerouted, all redirection information presentation restricted.</li> <li>- Call diversion, all redirection information presentation restricted.</li> <li>- Call rerouted, redirection number presentation restricted.</li> <li>- Call diversion, redirection number presentation restricted.</li> </ul> <p>The priv-value of the entry in the History-Info header is left absent for the following values:</p> <ul style="list-style-type: none"> <li>- No redirection.</li> <li>- Call rerouted.</li> <li>- Call diversion.</li> </ul> |
| Suppression Of Announcements | - | - | O | <p>This IE indicates that announcements or tones generated as a result of unsuccessful call setup shall be suppressed.</p> <p>Not used by MTAS.</p>   |

M=Mandatory(The IE shall always be sent), O=Optional (Service logic dependent)

Table 29 NA Carrier Information elements

| NA Carrier Information           | MO | MF | MT | Comment  |
|----------------------------------|----|----|----|--|
| NA Carrier Identification Code   | M  | M  | M  | This IE uniquely identifies a North American long distance carrier.<br><br>Not used by MTAS.                   |
| NA Carrier Selection Information | M  | M  | M  | This IE indicates the way the carrier was selected e.g.:<br>– dialled<br>– subscribed<br><br>Not used by MTAS. |

#### 4.2.2.4.1 Errors sent by MTAS as a response to this operation

The table below lists the errors that are generated by the MTAS application. For errors generated by the stack, for example violation of ASN.1 rules, see [11] for details.

| Error                       | Reason  |
|-----------------------------|---|
| MissingParameter            | The DestinationRoutingAddress information element is missing.   |
| SystemFailure               | The Application Process representing the call addressed by this operation is not available.                 |
| TaskRefused                 | -   |
| UnexpectedComponentSequence | This error is sent by MTAS if the operation is received in any other state than "Waiting for Instructions". |
| UnexpectedDataValue         | -   |
| UnexpectedParameter         | -   |

Table 30 Possible error responses to a CON

#### 4.2.2.5 Connect to Resource (CTR)



Table 31 CTR Information Elements

| Information element name           | MO | MF | MT | Description  |
|------------------------------------|----|----|----|--|
| Service Interaction Indicators Two | O  | O  | O  | This parameter indicates whether or not a bothway through connection is required between the Calling party and the MRFC/MRFP. When this information element is not present, a oneway connection from the MRF/MRFP to the user is assumed.. |
| Resource Address                   | O  | O  | O  | This information element indicates the physical location of the MRFC/MRFP.   |

Table 32 Resource Address Information Elements

| Information element name | MO | MF | MT | Description   |
|--------------------------|----|----|----|---|
| IP Routing Address       | O  | O  | O  | This IE indicates the routing address to set up a connection towards the MRFC/MRFP.<br><br>Not used by MTAS. The location of the media resources are configured.  |
| None                     | O  | O  | O  | This parameter indicates that the call party is to be connected to a predefined media resource known to MTAS by configuration.<br><br>Not used by MTAS. Media resources are always selected from locations known to MTAS. |

#### 4.2.2.5.1 Errors sent by MTAS as a response to this operation

The table below lists the errors that are generated by the MTAS application. For errors generated by the stack, for example violation of ASN.1 rules, see [11] for details.

| Error                       | Reason  |
|-----------------------------|---|
| MissingParameter            | -   |
| SystemFailure               | The Application Process representing the call addressed by this operation is not available.                 |
| TaskRefused                 | -   |
| UnexpectedComponentSequence | This error is sent by MTAS if the operation is received in any other state than "Waiting for Instructions". |
| UnexpectedDataValue         | -   |
| UnexpectedParameter         | -   |

Table 33 Possible error responses to a CTR

#### 4.2.2.6 Continue (CUE)

This indication has no information elements.

#### 4.2.2.7 Disconnect Forward Connection (DFC)

This indication has no information elements.

#### 4.2.2.8 Furnish Charging Information (FCI)

Table 34 FCI Information Elements

| Information element name             | MO | MF | MT | Description  |
|--------------------------------------|----|----|----|--|
| FCI Billing Charging Characteristics | M  | M  | M  | This information element is further described in Table 36. |

Table 35 FCI Billing Charging Characteristics Information Elements

| Information element name | MO | MF | MT | Description  |
|--------------------------|----|----|----|--|
| FCIBCCCAMEL Sequence 1   | M  | M  | M  | This information element is further described in Table 37. |

Table 36 FCIBCCCAMEL Sequence 1 Information Elements

| Information element name | MO | MF | MT | Description   |
|--------------------------|----|----|----|---|
| Free Format Data         | M  | M  | M  | This information element is a free format data to be inserted in the CAMEL logical call record.   |
| Party To Charge          | M  | M  | M  | This information element indicates the party for whom a call record will be created. Leg1 corresponds to the A party and Leg2 to the B party. |

#### 4.2.2.8.1 Errors sent by MTAS as a response to this operation

The table below lists the errors that are generated by the MTAS application. For errors generated by the stack, for example violation of ASN.1 rules, see [11] for details.

| Error | Reason |
|-------|--------|
|-------|--------|

|                             |  |
|-----------------------------|--|
| MissingParameter            | Sent when the FreeFormatData information element is missing.   |
| TaskRefused                 | -  |
| UnexpectedComponentSequence | This error is sent by MTAS if the operation is received in any other state than "Waiting for Instructions" or "Waiting for End of User Interaction" or "Monitoring". |
| UnexpectedDataValue         | -  |
| UnexpectedParameter         | -  |

*Table 37 Possible error responses to a FCI*

#### 4.2.2.9 Play Announcement (PA)

*Table 38 PA Information Elements*

| Information element name      | MO | MF | MT | Description   |
|-------------------------------|----|----|----|---|
| Information To Send           | M  | M  | M  | This information element, which is further specified in Table 40 indicates an announcement or a tone to be sent to the end user by MTAS.  |
| Disconnect From IP Forbidden  | M  | M  | M  | This information element indicates whether or not the media resources may be disconnected from the user when all information has been sent.<br><br>Default value for this IE is true.<br><br>Not supported by MTAS if Mr is used but supported when Mp is used. |
| Request Announcement Complete | M  | M  | M  | This information element indicates whether or not a SpecializedResourceReport shall be sent to the gsmSCF when all information has been sent.<br><br>Default value for this IE is true.   |

*Table 39 Information To Send Information Elements*

| Information element name | MO | MF | MT | Description  |
|--------------------------|----|----|----|--|
| Inband Info              | O  | O  | O  | This information element, which is further specified in Table 41 indicates the inband information to be sent.  |
| Tone                     | O  | O  | O  | This information element indicates the tone to be sent. The mapping from the code points of this information element to tones is a matter for agreement between the gsmSCF operator and the MTAS operator. |

*Table 40 Inband Info Information Elements*

| Information element name | MO | MF | MT | Description   |
|--------------------------|----|----|----|---|
| Message ID               | M  | M  | M  | This information element is further described in Table 42.  |
| Number Of Repetitions    | O  | O  | O  | This information element indicates the maximum number of times the message shall be sent to the end-user.   |
| Duration                 | O  | O  | O  | This information element indicates the maximum duration time in seconds that the message shall be played/repeated. Zero indicates endless repetition. |
| Interval                 | O  | O  | O  | This information element indicates the time interval in seconds between two repetitions.  |

*Table 41 Message ID Information Elements*

| Information element name | MO | MF | MT | Description   |
|--------------------------|----|----|----|---|
| Elementary Message ID    | O  | O  | O  | This information element indicates a single announcement  |
| Text                     | O  | O  | O  | This information element indicates a text to be sent. The text shall be transformed to inband information (speech) by the gsmSRF.<br><br>Not supported by MTAS. |
| Elementary Message IDs   | O  | O  | O  | This information element indicates a sequence of announcements  |
| Variable Message         | O  | O  | O  | This information element indicates an announcement with one or more variable parts.   |

*Table 42 Tone Information Elements*

| Information element name | MO | MF | MT | Description   |
|--------------------------|----|----|----|---|
| Tone ID                  | M  | M  | M  | This information element indicates the tone to be sent.   |
| Duration                 | O  | O  | O  | This information element indicates the maximum duration time in seconds that the message shall be played/repeated. Zero indicates endless repetition. |

#### 4.2.2.9.1 Errors sent by MTAS as a response to this operation

The table below lists the errors that are generated by the MTAS application. For errors generated by the stack, for example violation of ASN.1 rules, see [11] for details.

| Error     | Reason  |
|-----------|---|
| Cancelled | Sent when an announcement or tone was successfully cancelled. |

|                             |   |
|-----------------------------|---|
| MissingParameter            | Sent if both the information elements Toneld and ElementaryMessageIDs are missing.                  |
| SystemFailure               | The Application Process representing the call addressed by this operation is not available.         |
| UnavailableResource         | -   |
| UnexpectedComponentSequence | This error is sent by MTAS if the operation is received in any other state than "User Interaction". |
| UnexpectedDataValue         | -   |
| UnexpectedParameter         | -   |

Table 43 Possible error responses to a PA

#### 4.2.2.10 Prompt And Collect User Information (PC)

Table 44 PC Information Elements

| Information element name     | MO | MF | MT | Description  |
|------------------------------|----|----|----|--|
| Collected Info               | M  | M  | M  | This information element is further described in Table 46.   |
| Information To Send          | O  | O  | O  | This information element, which is further specified in Table 40, indicates an announcement or a tone to be sent to the end user by the gsmSRF.                          |
| Disconnect From IP Forbidden | O  | O  | O  | This information element indicates whether the MTAS should be disconnected from the user when all information has been sent.<br><br>Not supported by MTAS if Mr is used. |

Table 45 Collected Info Information Elements

| Information element name | MO | MF | MT | Description  |
|--------------------------|----|----|----|--|
| Collected Digits         | M  | M  | M  | This information element is described in Table 47. |

Table 46 Collected Digits Information Element

| Information element name | MO | MF | MT | Description   |
|--------------------------|----|----|----|---|
| Minimum Number Of Digits | O  | O  | O  | This information element indicates the minimum number of valid digits to be collected. The default value for this IE is 1.<br><br>Range is from 1 to 16.  |
| Maximum Number Of Digits | M  | M  | M  | This information element specifies the maximum number of valid digits to be collected.<br><br>Range is from 1 to 16.  |
| End Of Reply Digit       | O  | O  | O  | This information element indicates the digit(s) used to signal the end of input.  |
| Cancel Digit             | O  | O  | O  | If this information element is present, the cancel digit can be entered by the user to request a possible retry   |
| Start Digit              | O  | O  | O  | If this information element is present, the start digit(s) indicates the start of the valid digits to be collected.<br><br>Not supported by MTAS if Mr is used.   |
| First Digit Time Out     | O  | O  | O  | If this information element is present, the first digit shall be received before the expiration of the first digit timer expiration   |
| Inter Digit Time Out     | O  | O  | O  | If this information element is present, any subsequent valid or invalid digit shall be received by the MTAS before the inter digit timer expires.   |
| Error Treatment          | O  | O  | O  | This information element indicates what specific action shall be taken by the MTAS in the event of error conditions occurring.<br>When MTAS is configured with internal Mrfc the following logic applies.<br>- If "repeatPrompt" is received the initial announcement will be played again.<br>- If "help" is received the announcement in mtasNccCapPcAnnHelpUri will be played if set. If not set the initial announcement will be played.<br>When MTAS is configured with external Mrfc the default value stdErrorAndInfo is used. |
| Interruptable Ann Ind    | O  | O  | O  | If this information element is set to TRUE (default value) the announcement is interrupted after the first valid or invalid digit received by the MTAS. If this IE is present and explicitly set to FALSE, the announcement will not be interrupted after the first digit is received by the MTAS<br><br>Not supported by MTAS. The default value TRUE is used.   |
| Voice Information        | O  | O  | O  | This information element is optional, where the default value is specified being FALSE. If the  |

|            |   |   |   |  |
|------------|---|---|---|--|
|            |   |   |   | <p>VoiceInformation IE is set to FALSE, all valid or invalid digits are entered by DTMF. If this IE is present and explicitly set to TRUE, calling user is required to provide all valid or invalid information by speech.</p> <p>Not supported by MTAS. The default value FALSE, meaning DTMF only, is used.</p>  |
| Voice Back | O | O | O | <p>This information element is optional, where the default value is specified being FALSE. If the VoiceBack IE is set to FALSE, no voice back information is given by the MTAS. If this information element is present and explicitly set to TRUE, the valid input digits received by the MTAS will be announced back to the calling user immediately after the end of input is received.</p> <p>Not supported by MTAS. The default value FALSE is used.</p> |

#### 4.2.2.10.1 Result sent by MTAS as a response to this operation

Table 47 PromptAndCollect ReceivedInformation result

| Result        | MO | MF | MT | Description  |
|---------------|----|----|----|--|
| DigitResponse | M  | M  | M  | <p>This is the collected user input that is returned as a result of the Prompt and Collect operation. The format is GenericDigits, an octet string, where the first octet contains encoding scheme and type of digits. Encoding scheme is either odd or even depending on how many digits were collected. Type of digits is always the value reserved for account code, since type of digits is irrelevant for CAP. Using odd or even encoding scheme for non-decimal characters the encodings are: (*) as 1011 and (#) as 1100.</p> |

#### 4.2.2.10.2 Errors sent by MTAS as a response to this operation

The table below lists the errors that are generated by the MTAS application. For errors generated by the stack, for example violation of ASN.1 rules, see [11] for details.

| Error     | Reason   |
|-----------|--|
| Cancelled | Sent when the Prompt and Collect operation was successfully cancelled. |

|                             |   |
|-----------------------------|---|
| ImproperCallerResponse      | Sent if MTAS didn't receive any user interaction result from the MRFC/MRFP.                         |
| MissingParameter            | Sent if both the information elements Toneld and ElementaryMessageIDs are missing.                  |
| SystemFailure               | The Application Process representing the call addressed by this operation is not available.         |
| TaskRefused                 | -   |
| UnavailableResource         | -   |
| UnexpectedComponentSequence | This error is sent by MTAS if the operation is received in any other state than "User Interaction". |
| UnexpectedDataValue         | -   |
| UnexpectedParameter         | -   |

Table 48 Possible error responses to a PC

#### 4.2.2.11 Release Call (RC)

Table 49 RC Information Elements

| Information element name | MO | MF | MT | Description   |
|--------------------------|----|----|----|---|
| Cause                    | M  | M  | M  | <p>A number giving an indication to MTAS about the reason of releasing this specific call.</p> <p>This operation will trigger different SIP messages in MTAS. If the SIP session is being established MTAS always sends 480 Temporarily unavailable and if the SIP session has been established MTAS sends SIP BYE with a Reason header with the value Q.850 and a cause parameter containing this information element.</p> |

##### 4.2.2.11.1 Errors sent by MTAS as a response to this operation

The table below lists the errors that are generated by the MTAS application. For errors generated by the stack, for example violation of ASN.1 rules, see [11] for details.

| Error            | Reason |
|------------------|--------|
| MissingParameter | -      |



|                             |   |
|-----------------------------|---|
| SystemFailure               | The Application Process representing the call addressed by this operation is not available. |
| TaskRefused                 | -   |
| UnavailableResource         | -   |
| UnexpectedComponentSequence | -   |
| UnexpectedDataValue         | -   |
| UnexpectedParameter         | -   |

Table 50 Possible error responses to a RC

#### 4.2.2.12 Request Report BCSM Event (RRB)

Table 51 RRB Information Elements

| Information element name | MO | MF | MT | Description  |
|--------------------------|----|----|----|--|
| BCSM Event               | M  | M  | M  | This information element, which is further described in Table 53 specifies the event or events of which a report is requested. |

Table 52 BCSM Event Information Elements

| Information element name | MO | MF | MT | Description   |
|--------------------------|----|----|----|---|
| Event type               | M  | M  | M  | This information element specifies the type of event of which a report is requested.            |
| Leg ID                   | C  | C  | C  | This information element indicates the party in the call for which the event shall be reported. |
| Monitor Mode             | M  | M  | M  | This information element indicates how the event shall be reported.                             |
| DP Specific Criteria     | O  | O  | O  | This information element is further described in Table 54.                                      |

*Table 53 DP Specific Criteria Information Elements*

| Information element name | MO | M<br>F | M<br>T | Description   |
|--------------------------|----|--------|--------|---|
| Application Timer        | O  | O      | O      | This information element carries additional timer duration information (timer values for No Answer event) required for arming No_Answer EDPs in the gsmSSF. The TNRY timer (value defined between 10s and 40s) shall be shorter than the network no answer timer. |

#### 4.2.2.12.1 Errors sent by MTAS as a response to this operation

The table below lists the errors that are generated by the MTAS application. For errors generated by the stack, for example violation of ASN.1 rules, see [11] for details.

| Error                       | Reason  |
|-----------------------------|---|
| MissingParameter            | Sent by MTAS if the information element MonitorMode has a value other than "interrupted", "notifyAndContinue" or "transparent". |
| SystemFailure               | The Application Process representing the call addressed by this operation is not available.                                     |
| TaskRefused                 | -   |
| UnavailableResource         | -   |
| UnexpectedComponentSequence | This error is sent by MTAS if the operation is received in any other state than "Waiting for Instructions" or "Monitoring".     |
| UnexpectedDataValue         | -   |
| UnexpectedParameter         | -   |

Table 54 Possible error responses to a RRB

#### 4.2.2.13 Reset Timer (RT)

Table 55 RT Information Elements

| Information element name | MO | MF | MT | Description  |
|--------------------------|----|----|----|--|
| Timer Value              | M  | M  | M  | This information element specifies the value to which the timer Tssf shall be set. |
| Timer ID                 | O  | O  | O  | This information element has a default value indicating the Tssf value.            |

#### 4.2.2.13.1 Errors sent by MTAS as a response to this operation

The table below lists the errors that are generated by the MTAS application. For errors generated by the stack, for example violation of ASN.1 rules, see [11] for details.

| Error                       | Reason   |
|-----------------------------|--|
| MissingParameter            | -  |
| TaskRefused                 | -  |
| UnexpectedComponentSequence | This error is sent by MTAS if the operation is received in any other state than "Waiting for Instructions" or "Waiting for End of User Interaction". |
| UnexpectedDataValue         | -  |
| UnexpectedParameter         | -  |

Table 56 Possible error responses to a RT

## 4.3 SCF Service

### 4.3.1 Requests received by MTAS

#### 4.3.1.1 InitialIDP

MTAS SCF receives the following relevant parameters in the IDP:

Table 57 IDP Information Elements

| Information element name | MO | MF | MT | Comment   |
|--------------------------|----|----|----|---|
| Bearer Capability        | C  | C  | C  | <p>This IE indicates the type of the bearer capability connection to the user.</p> <p>Together with Higher Layer Compatibility, it is used by MTAS to determine the media type of the call.</p>   |
| Called Party Number      | C  | M  | M  | <p>This IE contains the number used to identify the called party in the forward direction.</p> <p>Sent by SSF in the MF and MT case when initialDP triggered by T-CSI, and optionally in the MO case<sup>1</sup> when InitialDP triggered by N-CSI.</p> <p>Used by MTAS to identify the called party number in the MT case, and in the MO case when MTAS policy for selecting called party number is configured to use Called Party Number in preference of Called Party BCD Number (mtasSdsCalledPartyNumberPreference).</p> <p>See [3], section 3.9 for encoding.</p> |
| Called Party BCD Number  | M  | -  | -  | <p>This IE contains the number used to identify the called party in the forward direction. The number contained in this IE shall be identical to the number received over the access network. It may e.g. include service selection information, such as * and # digits, or carrier selection information dialled by the subscriber.</p> <p>Sent by SSF in the MO case.</p> <p>Used by MTAS to identify the called party number in the MO case.</p> <p>See [1] for the included fields and [4], section 10.5.4.7 for encoding.</p>                                      |
| Calling Party Number     | M  | C  | C  | <p>This IE carries the calling party number to identify the calling party or the origin of the call.</p> <p>Used by MTAS to set the P-Asserted-Identity header in the MO case.</p> <p>See [3], section 3.10 for encoding.</p>   |
| Calling Partys Category  | M  | C  | C  | <p>Indicates the type of calling party (e.g., operator, pay phone, ordinary subscriber).</p> <p>Ignored by MTAS.</p>  |

<sup>1</sup> This is the case in solutions where O-SDS is triggered through N-CSI with inclusion of Called Party Number which contains translated number that is meant for call establishment. CAP IDP will also contain Called Party BCD Number which shall be ignored in this case if MTAS policy so configured (mtasSdsCalledPartyNumberPreference).

|                          |   |   |   |  |
|--------------------------|---|---|---|--|
| Call Reference Number    | M | M | M | <p>This IE may be used by the gsmSCF for inclusion in a network optional gsmSCF call record. It has to be coupled with the identity of the MSC which allocated it in order to define unambiguously the identity of the call. For MO calls, the call reference number is set by the serving VMSC and included in the MO call record. For MT calls, the call reference number is set by the GMSC and included in the RCF call record in the GMSC and in the MT call record in the terminating MSC. For CF calls, the call reference number is set by the GMSC and included in the CF record in the forwarding MSC.</p> <p>Ignored by MTAS.</p> |
| Event Type BCSM          | M | M | M | <p>This IE indicates the armed BCSM DP event, resulting in the Initial DP operation.</p> <p>Used by MTAS to identify MO (collectedInfo) or MT (termAttemptAuthorized) cases.</p> <p>This information element contains one of the possible values specified in [1].</p>   |
| High Layer Compatibility | C | - | C | <p>This IE indicates high layer characteristics.</p> <p>Together with Bearer Capability, it is used by MTAS to determine the media type of the call.</p>   |
| IMSI                     | M | M | M | <p>This IE identifies the mobile subscriber.</p> <p>MCC and MNC obtained from IMSI, together with MCC and MNC obtained from Location Information, are used by MTAS to determine whether the user is roaming or not.</p>  |
| Location Information     | M | - | C | <p>This IE is described in Table 59 and relates to the location of the served user.</p> <p>MCC and MNC obtained from Location Information, together with MCC and MNC obtained from IMSI, is used by MTAS to determine whether the user is roaming or not.</p>  |
| Location Number          | M | C | C | <p>For mobile originated calls this IE represents the location of the calling party. For all other call scenarios this IE contains the location number received in incoming ISUP signalling.</p> <p>Ignored by MTAS.</p>   |
| MSC Address              | M | M | M | <p>For MO calls, the MSC Address carries the international E.164 address of the serving VMSC.</p> <p>For MT calls, the MSC Address carries the international E.164 address of the GMSC.</p> <p>For MF calls, the MSC Address carries the international E.164 address of the forwarding MSC.</p>  |

|                         |   |   |   |   |
|-------------------------|---|---|---|---|
|                         |   |   |   | Ignored by MTAS.  |
| GMSC Address            | - | M | - | For MF calls, the GMSC Address carries the international E.164 address of the GMSC.<br><br>Ignored by MTAS.   |
| Redirecting Party ID    | - | M | C | This IE indicates the directory number the call was redirected from.<br>The service designer shall note that this parameter may not be available if the MF case is initiated with the Connect operation to a T-BCSM without Redirecting Party ID.<br><br>Ignored by MTAS.   |
| Redirection Information | - | M | C | It contains forwarding related information, such as redirection counter.<br>The service designer shall note that this parameter may not be available if the MF case is initiated with the Connect operation to a T-BCSM without Redirection Information.<br><br>Ignored by MTAS.  |
| Service Key             | M | M | M | This IE identifies for the gsmSCF the requested set of one or more CAMEL services. It is used to address the correct application/SLP within the gsmSCF.<br><br>Addresses the SCF service/application. MTAS supports multiple SCF services for both O-SDS and T-SDS. The service key for this SCF service is configured in MTAS, see [10] mtasSdsSupportedScfServiceKeys CM attribute. |
| Time And Timezone       | M | M | M | This IE contains the time that the gsmSSF was triggered, and the time zone the gsmSSF resides in.<br><br>Ignored by MTAS.   |

M=Mandatory(The IE shall always be sent), C=Conditional(The IE shall be sent, if available)

Table 58 Location Information elements

| Location Information element name | MO | MF | MT | Comment  |
|-----------------------------------|----|----|----|--|
| Location Number                   | -  | -  | C  | <p>For a definition of this information element, see [3]. Shall be present if the VLR can derive it from the stored cell global identity or location area identity; otherwise shall be absent. The mapping from cell ID and location area to location number is network-specific and outside the scope of the GSM standard.</p> <p>Not used by MTAS.</p>   |
| CellIdOrLAI                       | M  | -  | C  | <p>Cell global identity of the cell or Location Area identity in which the MS is currently in radio contact or in which the MS was last in radio contact. Shall be present if the subscriber record is marked as confirmed by radio contact; otherwise shall be absent.</p> <p>If CAMEL phase 1 or 2, or MAP pre-R99 is used in a 3G radio access of R99 or later network element then this IE may contain the 3G Service Area Identity (SAI). The encoding of SAI is identical to the Cell Global ID.</p> <p>Used by MTAS in the MO case to 1) set the CGI in P-Access-Network-Information header, and 2) to obtain CC from the MCC when calling party number is not given in International format.</p> <p>See [1] for the included fields and [4], section 10.5.1.1 and 10.5.1.3 for encoding.</p> |
| Geographical Information          | C  | -  | C  | <p>For a definition of this information element, see GSM 03.32 (Universal Geographical Area Description). Shall be present if the VLR can derive it from the stored cell global identity or location area identity; otherwise shall be absent.</p> <p>Not used by MTAS.</p>  |
| Age Of Location Information       | M  | -  | C  | <p>Measured in minutes. Shall be present if available in the MSC/VLR; otherwise shall be absent.</p> <p>Not used by MTAS.</p>  |
| VLR number                        | M  | -  | C  | <p>E.164 number which identifies the VLR (see GSM 03.03). If the HLR receives it from the VLR it shall ignore it.</p> <p>Sent only in the MO case if the access-type in the P-Access-Network-Info equals "3GPP-GERAN".</p> <p>Not used by MTAS.</p>  |

M=Mandatory(The IE shall always be sent), C=Conditional(The IE shall be sent, if available)

## 4.3.2 Responses sent by MTAS

### 4.3.2.1 Connect

*Table 59 Connect Information Elements*

| Information element name    | MO | MF | MT | Comment   |
|-----------------------------|----|----|----|---|
| Destination Routing Address | M  | M  | M  | <p>This IE contains the called party number towards which the call is to be routed.</p> <p>Used by MTAS to return the routing number to the IMS domain (IMRN) in E.164 International format, when the call is anchored in IMS domain.</p> <p>Used by MTAS to return the routing number to the called party number with escape code removed, when the call is anchored in CS domain.</p> |

M=Mandatory(The IE shall always be sent), O=Optional (Service logic dependent)

### 4.3.2.2 Continue

MTAS SCF responds with Continue on InitialDP in case of error, if SCF CAP error handling policy configured to respond with Continue.

MTAS SCF always responds with Continue on InitialDP:

- SCC or SDS function locked, or
- License for SCC or SDS not available or invalid, or
- Media call type is not supported when function to check media call type is enabled, or
- User is not served or no IMS anchoring is decided when function to check service profile for roaming agreement is enabled, or
- Called party number qualifies a local number when function to check local number is enabled.

### 4.3.2.3 SystemFailure

MTAS SCF responds with SystemFailure error on InitialDP if SCF CAP error handling policy configured to respond with error and:

- No IMRN available



- The Calling Party Number is in National format (NAI=0x03), or Called Party Number (if used) is not E.164 International (NAI=0x04 and NPI=0x01), or Called Party BCD Number (if used) is not E.164 International (TON=0x01 and NPI=0x01), and the Country Code (CC) could not be derived from IMSI because no ServedHplmn MO was configured for IMSI's MCC.MNC (for more information on ICS see [10] and for more information on configuration see [14]).

#### 4.3.2.4 TaskRefused

MTAS SCF responds with TaskRefused error on InitialDP if SCF CAP error handling policy configured to respond with error and the received operation is other than InitialDP.

#### 4.3.2.5 MissingCustomerRecord

MTAS SCF responds with MissingCustomerRecord error on InitialDP if SCF CAP error handling policy configured to respond with error and the ServiceKey in InitialDP does not match with supported SCF service.

#### 4.3.2.6 UnexpectedDataValue

MTAS SCF responds with UnexpectedDataValue error on InitialDP if SCF CAP error handling policy is configured to respond with error and:

When MO case applies

- Calling Party Number does not contain a valid address (APRI=0x02), or
- Calling Party Number is not Complete (NI=0x00), or not National E.164 (NAI=0x03 and NPI=0x01), or not International E.164 (NAI=0x04 and NPI=0x01), or
- Called Party Number is present and is not Unknown or E.164 type (NPI=0x00 or NPI=0x01), or
- Called Party BCD Number is present and is not Unknown or International (TON=0x00 or TON=0x01) or not Unknown or E.164 (NPI=0x00 or NPI=0x01)

When MT case applies

- Called Party Number is not E.164 (NPI=0x01) or not Unknown, National or International (NAI=0x02, NAI=0x03 or NAI=0x04), or
- Called Party Number with prefix is longer than 20 digits

#### 4.3.2.7 **MissingParameter**

MTAS SCF responds with MissingParameter error on InitialDP if SCF CAP error handling policy configured to respond with error and:

- IMSI is not present for both MO and MT calls.
- Location Information is not present for MO calls.

## 5 Formal Syntax or Schema

The formal syntax is described in [1].

## 6 Related Standards

See [1] and [2].

## 7 Terminology

### 7.1 Abbreviations

|      |  |
|------|--|
| BCD  | Binary Coded Decimal                     |
| BCSM | Basic Call Stat Machine                  |
| CAP  | CAMEL Application Part                   |
| CC   | Country Code                             |
| CGI  | Cell Global Identity                     |
| CI   | Cell Identity                            |
| CSI  | CAMEL Subscription Information           |
| DP   | Detection Point                          |
| GMSC | Gateway MSC                              |
| ICS  | IMS Centralized Services                 |
| IE   | Information Element                      |
| IMSI | International Mobile Subscriber Identity |
| IMRN | IP Multimedia Routing Number             |

|        |                                       |
|--------|---------------------------------------|
| IRS    | Implicit Registration Set             |
| LAC    | Location Area Code                    |
| LAI    | Location Area Identification          |
| MAP    | Mobile Application Part               |
| MCC    | Mobile Country Code                   |
| MNC    | Mobile Network Code                   |
| MO     | Mobile Originating                    |
| MF     | Mobile Forwarding                     |
| MSC    | Mobile Switching Center               |
| MT     | Mobile Terminating                    |
| NPLI   | Network Provided Location Information |
| N-CSI  | Network CSI                           |
| O-CSI  | Originating CSI                       |
| O-SDS  | Originating SDS                       |
| RCF    | Remote Call Forwarding                |
| SCC    | Service Centralization and Continuity |
| SCF    | Service Control Function              |
| SCP    | Service Control Point                 |
| SDS    | Service Domain Selection              |
| SRF    | Specialized Resource Function         |
| SSF    | Service Switching Function            |
| T-BCSM | Terminating BCSM                      |
| T-CSI  | Terminating CSI                       |
| T-SDS  | Terminating SDS                       |
| VLR    | Visited Location register             |
| VMSC   | Visitor MSC                           |
| VPLMN  | Visited Public Land Mobile Network    |

## 7.2 Definitions

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## 8 References

- [1] 3GPP TS 09.78 v7.1.0, Customised Applications for Mobile network Enhanced Logic (CAMEL); CAMEL Application Part (CAP) specification
- [2] 3GPP TS 03.78 v7.8.1, Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 2;
- [3] Q.763 (12/1999), Signalling System No. 7 – ISDN user part formats and codes
- [4] 3GPP TS 04.08 v7.21.0, Mobile radio interface layer 3 specification
- [5] 3GPP TS 09.02 V7.15.0, Mobile Application Part (MAP) specification
- [6] Q.931 (05/98), ISDN user-network interface layer 3 specification for basic call control
- [7] Q.850 (1998), Usage of cause and location in the digital subscriber signalling system No. 1 and the Signalling System No. 7 ISDN user part
- [8] 3GPP TS 29.163 v9.6.1, Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks
- [9] 74/1553-AVA 901 09/8, MTAS CAPv2 Management Guide
- [10] 71/1553-AVA 901 09/8, MTAS IMS Centralized Services Management Guide
- [11] 25/155 19-CAA 901 1470, INAP ETSI FS API
- [12] 9/155 19-AVA 901 18, Sh/Dh Interface in MTAS
- [13] 22/155 19-AVA 901 18, MTAS CAI3G Interface
- [14] 1/190 84-AVA 901 09/8, MTAS Parameter Description