3GPP TSG CN Plenary Meeting #22 **NP-030516**
10th – 12th December 2003 Maui, USA.

Source: TSG CN WG4

Title: Corrections on small Technical Enhancements and Improvements on Rel-6 MAP

Agenda item: 9.20

Document for: APPROVAL

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
29.002	677		N4-031098	Rel-6	Enhancements for the Partial Implementation for "Change of position procedure armed with criteria"	B	6.3.0
29.002	648	2	N4-031274	Rel-6	Message Segmentation Mechanisms	D	6.3.0
29.002	703		N4-031315	Rel-6	Addition of requestingPLMN-ID to Send Authentication Info Request	B	6.3.0

3GPP TSG CN WG4 Meeting #20 **N4-031274**
Bangkok, THAILAND, 27th – 31st October 2003

CR-Form-v7

CHANGE REQUEST

⌘ **29.002** **CR** 648 ⌘ **rev** **2** ⌘ Current version: **6.3.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Message Segmentation Mechanisms
Source:	⌘	CN4
Work item code:	⌘	TEI6
Date:	⌘	22/10/2003
Category:	⌘	**D**
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change:	⌘	To summarize the message segmentation mechanisms in use
Summary of change:	⌘	Add informative Annex
Consequences if not approved:	⌘	Lack of systematic guidance with respect to message segmentation.

Clauses affected:	⌘	new Annex

Other specs affected:	⌘	Y	N		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	

Other comments: ⌘

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Annex C (informative) :
~~Void~~Message Segmentation Mechanisms

Various segmentation mechanisms are in use to overcome the problem where a MAP parameter carried in an Invoke, Result (or Error) component is too long to fit into a single SCCP UDT message. These mechanisms are:

C.1 SCCP segmentation

Instead of one UDT message several XUDT messages are used according to

Signalling Connection Control Part, Signalling System no. 7 ITU-T recommendation (07/96) Q.711 to Q.716 ('White Book SCCP').

This mechanism may be used for all MAP messages. If no segmentation mechanism at the TCAP or MAP level is available, this is the only remaining possibility.

This mechanism has no impact on the MAP provider level and above; the MAP provider sees the parameter as being sent in a single segment.

It should be noted that not all SCCP transit nodes (world wide) currently support the transfer of XUDT messages. Therefore XUDT messages may be lost without notice, depending on the route the message takes. The routes which successive messages take between two end points can differ because of load balancing. It is therefore recommended that this mechanism is used only for:

a) messages which do not cross PLMN boundaries (when the PLMN operator ensures that all SCCP transit nodes within his PLMN support White Book SCCP)

b) messages with low priority i.e. loss of the message does not result in serious misoperation.

It should be noted that the decision whether or not a message crosses PLMN boundaries needs to be taken at the MAP application level; it is therefore based on the message's operation code rather than on the SCCP called party address, i.e. only messages which never cross PLMN boundaries due to the type of message (SendIdentification, SendRoutingInfo without OR, AnyTimeInterrogation, ...) can be regarded as not crossing PLMN boundaries.

C.2 TCAP segmentation

At the TCAP level the following segmentation mechanisms are available:

C.2.1 Empty Begin

In a dialogue with AC version >1 the first forward message (Begin) must contain a Dialogue Portion. Instead of sending the Dialogue Portion and the Component Portion in the first forward message, an empty Begin (i.e. without a Component Portion) is sent, followed (after successful dialogue establishment) by a Continue message which can carry a longer Component Portion since no Dialogue Portion is present in the second forward message.

C.2.2 Empty Continue

In a dialogue with AC version >1 the first backward message (Continue / End) must contain a Dialogue Portion. Instead of sending the Dialogue Portion and the Component Portion in the first backward message, an empty Continue (i.e. without a Component Portion) is sent, followed by a Continue/End message which can carry a longer Component Portion since no Dialogue Portion is present in the second backward message.

C.2.3 TC-Result-NL

A Result component may be segmented into one or several Result-Not-Last components followed by a Result-Last component. As specified in subclause 15.6.3, the MAP user parameter shall be split so that each segment is compatible with the type defined for the parameter of the result of the associated operation.

Note that this segmentation mechanism runs the risk that the message carrying the Result-Last component arrives before the message carrying a Result-Not-Last component which results in failure. The use of SCCP class 1 "Sequence guaranteed", which raises the chance of in sequence delivery, is recommended.

C.3 MAP Segmentation

At the MAP level the following segmentation mechanisms are available:

C.3.1 Invoke without explicit indication

An Invoke component may be segmented into several Invoke components. These may be sent in burst mode (in which case SCCP class 1 is recommended) or in acknowledged mode. The receiving node does not get an indication of whether or not more segments will be received, so it must not close the dialogue. The MAP user parameter shall be split so that each segment is compatible with the type defined for the parameter of the invoke of the associated operation.

C.3.2 Invoke with explicit indication

An Invoke component may be segmented into several Invoke components sent in acknowledged mode. Each component contains at the MAP level an indication of whether or not subsequent components will follow. The receiving node terminates the dialogue when the last component is received. The MAP user parameter shall be split so that each segment is compatible with the type defined for the parameter of the invoke of the associated operation.

C.3.3 Result

A Result (last) component may be segmented into several Result (last) components sent in acknowledged mode where a new (empty) Invoke component serves as an acknowledgment. The last segment is not acknowledged. The MAP user parameter shall be split so that each segment is compatible with the type defined for the parameter of the result of the associated operation.

The following tables show the applicability of the mechanisms described above:

AC Version 4:

Parameter	SCCP-segmentation	Empty Begin	Empty Continue	TC-Result-NL	Invoke without indication	Invoke with indication	Result
ResumeCallHandlingArg	allowed	not allowed	n.a.	n.a.	not allowed	recommended	n.a.

AC Version 3:

Parameter	SCCP-segmentation	Empty Begin	Empty Continue	TC-Result-NL	Invoke without indication	Invoke with indication	Result
InsertSubscriberDataArg	risky	not allowed	n.a.	n.a.	recommended	n.a.	n.a.
SendIdentificationRes	allowed	n.a.	not allowed	not allowed	n.a.	n.a.	recommended
PrepareHO-Arg	allowed	not allowed	n.a.	n.a.	not allowed	n.a.	n.a.
PrepareHO-Res	allowed	n.a.	recommended	not recommended	n.a.	n.a.	not allowed
ProcessAccessSignalling-Arg	allowed	n.a.	n.a.	n.a.	not allowed	n.a.	n.a.
ForwardAccessSignalling-Arg	allowed	n.a.	n.a.	n.a.	not allowed	n.a.	n.a.
PrepareSubsequentHO-Arg	allowed	n.a.	n.a.	n.a.	not allowed	n.a.	n.a.
PrepareSubsequentHO-Res	allowed	n.a.	n.a	not recommended	n.a.	n.a.	not allowed
SendAuthenticationInfoRes	risky	n.a.	not allowed	not allowed	n.a.	n.a.	recommended
ProvideSubscriberInfoRes	allowed	n.a.	not allowed	not recommended	n.a.	n.a.	not allowed
AnyTimeInterrogationRes	allowed	n.a.	not allowed	not recommended	n.a.	n.a.	not allowed
AnyTimeModificationRes	allowed	n.a.	not allowed	recommended	n.a.	n.a.	not allowed
AnyTimeSubscriptionInterrogationRes	allowed	n.a.	not allowed	recommended	n.a.	n.a.	not allowed
noteSubscriberDataModifiedArg	allowed	not allowed	n.a.	n.a.	not allowed	recommended	n.a.
SendRoutingInfoRes	allowed	n.a.	not allowed	recommended	n.a.	n.a.	not allowed
MO-ForwardSM-Arg	allowed	recommended	n.a.	n.a.	not allowed	n.a.	n.a.
MT-ForwardSM-Arg	allowed	recommended	n.a.	n.a.	not allowed	n.a.	n.a.

AC Version 2:

Parameter	SCCP-segmentation	Empty Begin	Empty Continue	TC-Result-NL	Invoke without indication	Invoke with indication	Result
InsertSubscriberDataArg	risky	not allowed	not allowed	n.a.	recommended	n.a.	n.a.
SendIdentificationRes	allowed	n.a.	not allowed	not recommended	n.a.	n.a.	not allowed
SendAuthenticationInfoRes	risky	n.a.	not allowed	not recommended	n.a.	n.a.	not allowed
MO-ForwardSM-Arg	allowed	recommended	n.a.	n.a.	not allowed	n.a.	n.a.

MT-ForwardSM-Arg	allowed	recommended	n.a.	n.a.	not allowed	n.a.	n.a.
PrepareHO-Res	allowed	n.a.	recommended	not recommended	n.a.	n.a.	not allowed

AC Version 1:

Parameter	SCCP-segmentation	Empty Begin	Empty Continue	TC-Result-NL	Invoke without indication	Invoke with indication	Result
InsertSubscriberDataArg	risky	n.a.	n.a.	n.a.	recommended	n.a.	n.a.
SentParameterList	risky	n.a.	n.a.	recommended	n.a.	n.a.	not allowed

In the tables above the keywords "recommended", "allowed", "risky", "not recommended", "not allowed" and "n.a." are used as follows:

"**recommended**"
indicates that the normative part of this specification explicitly specifies the use of this mechanism for the parameter in question;

"**allowed**"
indicates that the normative part of this specification allows the use of this mechanism for the sending node and mandates support of this mechanism for the receiving node;

"**risky**"
indicates that the mechanism is "allowed".However, the use of this mechanism for the parameter in question may result in serious misoperation because SCCP transit nodes are not guaranteed to support XUDT messages.

"**not recommended**"
indicates that the normative part of this specification does not explicitly specify the use of this mechanism for the parameter in question.

"**not allowed**"
indicates that the normative part of this specification implicitly prohibits the use of this mechanism for the parameter in question.

"**n.a.**"
indicates that the mechanism is not applicable for the parameter in question.

3GPP TSG CN WG4#21
Bangkok, Thailand, 27th - 31st October, 2003

TDoc N4-031098

CR-Form-v7

CHANGE REQUEST

⌘ **29.002** **CR** **677** ⌘ **rev** **-** ⌘ Current version: **6.3.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Enhancements for the Partial Implementation for "Change of position procedure armed with criteria"
Source:	⌘	CN4
Work item code:	⌘	TEI6
Date:	⌘	13/10/2003
Category:	⌘	**B**
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	3GPP SA meeting #18 has approved Release 6 CR 22.078-160 "Criteria for "change of position" procedures" (SP-030462) A current 23.078 CR is proposing to consider this enhancements in the stage 2 23.078 in respect to the Scope and to the Partial Implementation issue. The current 29.002 CR is proposing an encoding for the new functionality.
Summary of change:	⌘	Introduction of an extra bits indicating the new OfferedCamel4Functionalities. The name of the bit is similar to the 23.078 information element names "Criteria for Change Of Position DP".
Consequences if not approved:	⌘	The CAMEL Phase 4 feature of Partial Implementation is not available for Criteria for Change Of Position DP.

Clauses affected:	⌘	17.7.1

		Y	N			
Other specs affected:	⌘	X		Other core specifications	⌘	23.078 CR
			X	Test specifications		
			X	O&M Specifications		

Other comments:	⌘	The 29.002 proposed encoding assumes that "CAMEL Phase 4" is still used for CAMEL Release 6.

—Modified section —

17.7.1 Mobile Service data types

```
MAP-MS-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-MS-DataTypes (11) version9 (9)}

DEFINITIONS

IMPLICIT TAGS

::=

BEGIN

...
```

```
OfferedCamel4Functionalities ::= BIT STRING {
     initiateCallAttempt                (0),
     splitLeg                           (1),
     moveLeg                            (2),
     disconnectLeg                      (3),
     entityReleased                     (4),
     dfc-WithArgument                   (5),
     playTone                           (6),
     dtmf-MidCall                       (7),
     chargingIndicator                  (8),
     alertingDP                         (9),
     locationAtAlerting                 (10),
     changeOfPositionDP                 (11),
     or-Interactions                    (12),
     warningToneEnhancements            (13),
     cf-Enhancements                    (14),
     criteriaForChangeOfPositionDP      (xx)
} (SIZE (15..32))
-- A node supporting Camel phase 4 shall mark in the BIT STRING all Camel4
-- functionalities it offers.
-- Other values than listed above shall be discarded.
```

```
...
```

— END —

3GPP TSG CN WG4 Meeting #21 **N4-031315**
Bangkok, THAILAND, 27th – 31st October 2003

CR-Form-v7

CHANGE REQUEST

⌘ **29.002** **CR** **703** ⌘ **rev** **-** ⌘ Current version: **6.3.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Addition of requestingPLMN-ID to Send Authentication Info Request
Source:	⌘	CN4
Work item code:	⌘	TEI-6
Date:	⌘	28/10/2003
Category:	⌘	**B**
Release:	⌘	Rel-6

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R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	To meet SA3's requirement for the special RAND mechanism.
Summary of change:	⌘	Add the parameter requestingPLMN-ID to SendAuthenticationInfoArg.
Consequences if not approved:	⌘	Needed information must be extracted from the lower layer.

Clauses affected:	⌘	8.5.2, 17.7.1

Other specs affected:	⌘	Y	N		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	

Other comments: ⌘

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8.5.2 MAP_SEND_AUTHENTICATION_INFO service

8.5.2.1 Definition

This service is used between the VLR and the HLR for the VLR to retrieve authentication information from the HLR. The VLR requests up to five authentication vectors.

Also this service is used between the SGSN and the HLR for the SGSN to retrieve authentication information from the HLR. The SGSN requests up to five authentication vectors.

If the user is a UMTS subscriber, the HLR shall return authentication quintuplets. If the user is a GSM subscriber, the HLR shall return authentication triplets.

If the HLR cannot provide the VLR or the SGSN with triplets, an empty response is returned. The VLR or the SGSN may then re-use old authentication triplets, except where this is forbidden under the conditions specified in 3GPP TS 43.020 [24].

If the HLR cannot provide the VLR or the SGSN with quintuplets, an empty response is returned. The VLR or the SGSN shall not re-use old authentication quintuplets.

If the VLR or SGSN receives a MAP_SEND_AUTHENTICATION_INFO response containing a User Error parameter as part of the handling of an authentication procedure, the authentication procedure in the VLR or SGSN shall fail.

Security related network functions are further described in 3GPP TS 43.020 [24] and 3GPP TS 33.200.

The service is a confirmed service and consists of four service primitives.

8.5.2.2 Service primitives

The service primitives are shown in table 8.5/2.

Table 8.5/2: MAP_SEND_AUTHENTICATION_INFO parameters

Parameter name	Request	Indication	Response	Confirm
Invoke id	M	M(=)	M(=)	M(=)
IMSI	C	C(=)		
Number of requested vectors	C	C(=)		
Requesting node type	C	C(=)		
Re-synchronisation Info	C	C(=)		
Segmentation prohibited indicator	C	C (=)		
Immediate response preferred indicator	U	C (=)		
Requesting PLMN ID	C	C(=)		
AuthenticationSetList			C	C(=)
User error			C	C(=)
Provider error				O

8.5.2.3 Parameter use

Invoke id

See clause 7.6.1 for the use of this parameter.

IMSI

See clause 7.6.2 for the use of this parameter.

This parameter shall be present in the first (or only) request of the dialogue. If multiple service requests are present in a dialogue then this parameter shall not be present in any service request other than the first one.

Number of requested vectors

A number indicating how many authentication vectors the VLR or SGSN is prepared to receive. The HLR shall not return more vectors than indicated by this parameter.

This parameter shall be present in the first (or only) request of the dialogue. If multiple service requests are present in a dialogue then this parameter shall not be present in any service request other than the first one.

Requesting node type

The type of the requesting node (SGSN or VLR).

This parameter shall be present in the first (or only) request of the dialogue. If multiple service requests are present in a dialogue then this parameter shall not be present in any service request other than the first one.

Re-synchronisation Info

For definition and use of this parameter see 3GPP TS 33.200.

If multiple service requests are present in a dialogue then this parameter shall not be present in any service request other than the first one..

Segmentation prohibited indicator

This parameter indicates if the VLR or SGSN allows segmentation of the response at MAP user level.

This parameter may be present only in the first request of the dialogue.

Immediate response preferred indicator

This parameter indicates that one of the requested authentication vectors is requested for immediate use in the VLR or SGSN. It may be used by the HLR together with the number of requested vectors and the number of vectors stored in the HLR to determine the number of vectors to be obtained from the AuC. It shall be ignored if the number of available vectors is greater than the number of requested vectors.

If multiple service requests are present in a dialogue then this parameter shall not be present in any service request other than the first one.

Requesting PLMN ID

The PLMN-ID of the requesting node. See 3GPP TS 23.003.

This parameter shall be present in the first (or only) request of the dialogue. If multiple service requests are present in a dialogue then this parameter shall not be present in any service request other than the first one.

AuthenticationSetList

A set of one to five authentication vectors are transferred from the HLR to the VLR or from the HLR to the SGSN, if the outcome of the service was successful.

User error

One of the following error causes defined in clause 7.6.1 shall be sent by the user in case of unsuccessful outcome of the service, depending on the respective failure reason:

- unknown subscriber;
- unexpected data value;
- system failure;
- data missing.

Provider error

See clause 7.6.1 for the use of this parameter.

.....

17.7.1 Mobile Service data types

.....

```
SendAuthenticationInfoArg ::= SEQUENCE {
    imsi                                [0] IMSI,
    numberOfRequestedVectors            NumberOfRequestedVectors,
    segmentationProhibited              NULL                              OPTIONAL,
    immediateResponsePreferred          [1] NULL                           OPTIONAL,
    re-synchronisationInfo              Re-synchronisationInfo            OPTIONAL,
    extensionContainer                  [2] ExtensionContainer            OPTIONAL,
    ...,
    requestingNodeType                  [3] RequestingNodeType            OPTIONAL,
    requestingPLMN-Id                   [4] PLMN-Id                       OPTIONAL}
```

```
PLMN-Id ::= OCTET STRING (SIZE (3))
    -- The internal structure is defined as follows:
    -- octet 1 bits 4321                Mobile Country Code 1st digit
    --         bits 8765                Mobile Country Code 2nd digit
    -- octet 2 bits 4321                Mobile Country Code 3rd digit
    --         bits 8765                Mobile Network Code 3rd digit
    --                                  or filler (1111) for 2 digit MNCs
    -- octet 3 bits 4321                Mobile Network Code 1st digit
    --         bits 8765                Mobile Network Code 2nd digit
```