3GPP TSG_CN   **Tdoc NP-000243**
Plenary Meeting #8, Dusseldorf, Germany
21ˢᵗ – 23ʳᵈ June 2000.

Source:	**TSG_N WG 2**
Title:	**CRs to 3G Work Item CAMEL phase 3 - Stage 2, Category C**
Agenda item:	**6.2.2**
Document for:	**APPROVAL**

Introduction:

This document contains **3** CRs on **Work Item CAMEL phase 2,** that have been agreed by **TSG_N WG 2,** and are forwarded to **TSG_N Plenary** meeting #8 for approval.

Tdoc	Spec	CR	Rev	CAT	Rel.	Old Ver	New Ver	Subject
N2A000348	23.078	140		C	R99	3.4.0	3.5.0	Disallowing Compound Basic Service group codes for conditional triggering
N2A000385	23.078	142	1	C	R99	3.4.0	3.5.0	Proposed information flow on Notify subscriber Data Change
N2-000201	23.078	148	1	C	R99	3.4.0	3.5.0	Usage of GPRS Reference Number

CHANGE REQUEST

23.078 CR **140**   Current Version: 3.4.0

For submission to: CN#8   for approval **X**   strategic
                                    for information   non-strategic

Proposed change affects: (U)SIM   ME   UTRAN / Radio   Core Network **X**

Source: N2   **Date:** 22/03/2000

Subject: Disallowing *Compound Basic Service group codes* for conditional triggering

Work item: CAMEL Phase 3

Category: F   Correction   **Release:**   Phase 2
                A   Corresponds to a correction in an earlier release   Release 96
                B   Addition of feature   Release 97
                C   Functional modification of feature   **X**   Release 98
                D   Editorial modification   Release 99   **X**
                                                                                           Release 00

Reason for change: The trigger conditions for Mobile Originated, Mobile Forwarded and Mobile Terminated calls may contain a criterion on the Basic Service codes.
The Basic Service criterion may be a specific Basic Service code or a Basic Service Group code.

It should, however, not be allowed that the Basic Service criterion is a *Compound Basic Service group code*, as defined in 3G TS 29.002.

The present CR proposes to include a statement to this effect in the specification, ie. a statement that the Basic Service criterion may only be a specific Basic Service code or a Basic Service Group code, not a Compound Basic Service group code.

Clauses affected: 4.2

Other specs Affected: Other 3G core specifications   **X**   → List of CRs: 29.002
                            Other GSM core specifications   → List of CRs:
                            MS test specifications   → List of CRs:
                            BSS test specifications   → List of CRs:
                            O&M specifications   → List of CRs:

Other comments:

*** *First Modification* ***

4.2 Detection Points (DPs)

4.2.1 Definition and description

Certain basic call events may be visible to the GSM Service Control Function (gsmSCF). The DPs are the points in call at which these events are detected. The DPs for Mobile Originated Calls and Mobile Terminated Calls are described in subclauses 4.4.2 and 4.4.3.

A DP can be armed in order to notify the gsmSCF that the DP was encountered, and potentially to allow the gsmSCF to influence subsequent handling of the call. If the DP is not armed, the processing entity continues the processing without gsmSCF involvement.

Three different types of DPs are identified:

- Trigger Detection Point - Request (TDP-R)

  This detection point is statically armed and initiates a CAMEL control relationship when encountered and there is no existing relationship due to same CSI.. Processing is suspended when the DP is encountered.

- Event Detection Point - Request (EDP-R)

  This detection point is dynamically armed within the context of a CAMEL control relationship. Processing is suspended when encountering the DP and the gsmSSF waits for instructions from the gsmSCF.

- Event Detection Point - Notification (EDP-N)

  This detection point is dynamically armed within the context of a CAMEL control relationship. Processing is not suspended when encountering the DP.

The DPs are characterized in the following subclauses.

4.2.1.1 Arming/disarming mechanism

The mechanism by which the DP is armed. A DP may be statically armed or dynamically armed.

The following arming rules apply:

- DP for mobile terminating call handling is statically armed in GMSC as result of T-CSI delivery from HLR. DP for mobile terminating call handling is statically armed in VMSC as result of VT-CSI delivery from VLR. DP for forwarding leg handling is statically armed in GMSC as result of O-CSI delivery from HLR. DP for mobile originating call or forwarded leg handling is statically armed in VMSC as result of O-CSI delivery from VLR.

- A DP is dynamically armed by the gsmSCF within the context of a CAMEL control relationship (between the gsmSSF and the gsmSCF).

The following disarming rules apply:

- A statically armed DP is disarmed when a O-CSI, T-CSI or VT-CSI is withdrawn in the HLR. Only TDP-Rs can be disarmed using this mechanism.

- If an armed EDP is met, then it is disarmed.

- If an EDP is met that causes the release of the related leg, then all EDPs related to that leg are disarmed.

- If a call is released, then all EDPs related to that call are disarmed.

- If an EDP is met, then other EDPS are disarmed, in accordance with the implicit disarming rule table (see section 4.4.4).

- If an EDP is armed, it can be explicitly disarmed by the gsmSCF by means of the RequestReportBCSMEvent information flow.

4.2.1.2 Criteria

Criteria are the conditions that must be met in order for the gsmSSF to request instructions from the gsmSCF.

4.2.1.2.1 Criteria at DP Collected_Info

The criteria for an mobile originating call are checked in the originating MSC.

The criteria for an mobile forwarded call are checked in the forwarding MSC.

For early forwarded calls in the GMSC, the HLR may decide not to include the DP Collected_Info trigger criteria in the subscriber data sent to the GMSC if the trigger criteria for the call are not met.

For optimally routed late forwarded calls, the MSC may decide not to include the DP Collected Info trigger criteria in the RCH message sent to the GMSC, if the trigger criteria for the call are not met.

The following criteria are applicable for DP Collected_Info:

- Destination number triggering criterion: The HLR may store a list of up to 10 destination numbers and/or up to 3 number lengths. There is no restriction on the nature of address. There is no restriction on the numbering plan indicator. This criterion may be defined to be either "enabling" or "inhibiting".

- Basic service triggering criterion: The HLR may store a list of up to 5 basic service codes, each of which may represent an individual basic service or a basic service group. Compound basic service group codes, as defined in 3G TS 29.002 [4], are not allowed for conditional triggering. This list is a triggering list.

- Forwarding triggering criterion: The HLR may store an indicator that triggering shall occur only for a call which has been subject to GSM or CAMEL call forwarding. This criterion may be defined to be either "enabling" or "inhibiting".

For MO calls, triggering at DP Collected_Info shall be strictly based on the number received over the access network. No service selection information, such as ∗ and # digits, or carrier selection information, dialled by the subscriber, shall be removed from the number before conditional triggering check takes place.

For MF calls at the VMSC, triggering at DP Collected_Info shall be strictly based on the number received over the access network (the Deflected-to-Number in case of Call Deflection), the Forwarded-to-Number retained in the VLR or the Destination Routing Address received in the Connect operation from SCF during a Terminating CAMEL Service at the VMSC.
No service selection information or carrier selection information shall be removed from the number before conditional triggering check takes place.

For MF calls at the GMSC, triggering at DP Collected_Info shall be strictly based on the Forwarded-to-Number received from HLR, on the Destination Routing Address received in the Connect operation from SCF during a Terminating CAMEL Service or on the Forwarded-to-Number received in the RCH message.
No service selection information or carrier selection information shall be removed from the number before conditional triggering check takes place.

One or more DP criteria may be applicable. All applicable triggering criteria must be satisfied before the dialogue is established with the gsmSCF.

If the destination number triggering criterion is enabling, then the gsmSSF may establish a dialogue with the gsmSCF if:

- the destination number matches one of the destination number strings defined in the list, or

- the length of the destination number matches one of the destination number lengths defined in the list.

In this test the destination number matches one of the destination number strings in the list if:

- the nature of address of destination number is the same as the nature of address of the destination number string

- the destination number is at least as long as the destination number string in the list, and

- all the digits in the destination number string in the list match the leading digits of the destination number.

If the destination number triggering criterion is inhibiting, then the gsmSSF may establish a dialogue with the gsmSCF if:

- the destination number does not match any of the destination number strings defined in the list, and

- the length of the destination number does not match any of the destination number lengths defined in the list.

In this test the destination number matches one of the destination number strings in the list if:

- the nature of address of destination number is the same as the nature of address of the destination number string

- the destination number is at least as long as the destination number string in the list, and

- all the digits in the destination number string in the list match the leading digits of the destination number.

The basic service triggering criterion is met if the basic service for the call matches a stored individual basic service code or is a member of the group defined by a stored basic service group code. For the purpose of this paragraph a general bearer service is a member of the corresponding bearer service group.

If the forwarding triggering criterion is enabling, then the gsmSSF may establish a dialogue with the gsmSCF only if the call has been subject to CAMEL or GSM call forwarding. If the forwarding triggering criterion is inhibiting, then the gsmSSF may establish a dialogue with the gsmSCF only if the call has not been subject to CAMEL or GSM call forwarding.

4.2.1.2.2   Criteria at DP Analysed_Information

The criteria for a mobile originating call are checked in the originating MSC. The criteria for a mobile forwarded call are checked in the forwarding MSC.

For early forwarded calls in the GMSC, the HLR shall always include the trigger criteria in the subscriber data sent to the GMSC. Reason is that the HLR can not check the criteria applicable at DP Analysed Info, since the number that the criteria check shall be based on, may be modified by a Mobile Terminating or Mobile Forwarding Service Logic for this call.

For optimally routed late forwarded calls, the MSC shall always include the trigger criteria in the RCH message sent to the GMSC. Reason is that the MSC can not check the criteria applicable at DP Analysed Info, since the number that the criteria check shall be based on, may be modified by a Mobile Terminating or Mobile Forwarding Service Logic for this call.

The following criteria are applicable for DP Analysed_Information:

- Destination number triggering criterion: The HLR may store a list of up to 10 destination numbers. There is no restriction on the nature of address. There is no restriction on the number plan indicator.

For MO calls, triggering at DP Analysed_Info shall be based on the number received over the access network. Any service selection information, including ∗ and # digits, or carrier selection information, dialled by the subscriber, shall be removed from the number before conditional triggering check takes place. No translation shall be performed on the number for triggering purposes.
Refer to 3G TS 22.030 [22] for the codes and values for service feature codes.

For MF calls at the VMSC, triggering at DP Analysed_Info shall be based on the number received over the access network (the Deflected-to-Number in case of Call Deflection), the Forwarded-to-Number retained in the VLR, or the Destination Routing Address in the Connect operation from the SCF during a Mobile Terminated or Mobile Forwarded CAMEL Service.
Any service selection information or carrier selection information shall be removed from the number before conditional triggering check takes place. No translation shall be performed on the number for triggering purposes.

For MF calls at the GMSC, triggering at DP Analysed_Info shall be based on the Forwarded-to-Number received from HLR, on the Destination Routing Address received in the Connect operation from SCF during a Mobile Terminated or Mobile Forwarded CAMEL Service, or on the Forwarded-to-Number received in the RCH message.
Any service selection information or carrier selection information shall be removed from the number before conditional triggering check takes place. No translation shall be performed on the number for triggering purposes.

In this test the destination number matches one of the destination number strings in the list if:

- the nature of address of the destination number is the same as the nature of address of the destination number string

- the destination number is at least as long as the destination number string in the list, and

- all the digits in the destination number string in the list match the leading digits of the destination number.

4.2.1.2.3 Criteria at DP Route_Select_Failure

The HLR may store a list of up to 5 cause values.

The criteria for a mobile originating call are checked in the originating MSC. The criteria for a mobile forwarded call are checked in the forwarding MSC.

For early forwarded calls in the GMSC, the HLR shall always include the trigger criteria in the subscriber data sent to the GMSC. Reason is that the cause code received from ISUP is used in the trigger criteria check. The cause code is not known at the time of sending the O-CSI to the GMSC.

For optimally routed late forwarded calls, the MSC shall always include the trigger criteria in the RCH message sent to the GMSC. Reason is that the cause code received from ISUP is used in the trigger criteria check. The cause code is not known at the time of sending the O-CSI to the GMSC.

The following criteria are applicable for DP Route_Select_Failure:

- Release cause code

The trigger criteria are met if the cause code received from ISUP is equal to at least one of the cause codes in the trigger criteria list.

If a O-BCSM was already invoked and there is a relationship at that moment, then no Service Logic shall be invoked.

4.2.1.2.4 Criteria at DP Terminating_Attempt_Authorised

The HLR may store a list of up to 5 basic service codes, each of which may represent an individual basic service or a basic service group. Compound basic service group codes, as defined in 3G TS 29.002 [4], are not allowed for conditional triggering. This list is a triggering list.

The criteria for DP Terminating_Attempt_Authorised are checked in the HLR for the GMSC or in the VLR for the MSC. The HLR shall only include T-CSI in the CAMEL subscription information sent to the GMSC if the criteria are met. The VLR shall only include VT-CSI in the CAMEL subscription information sent to the MSC if the criteria are met.

The basic service criterion is met if the basic service for the call matches a stored individual basic service code or is a member of the group defined by a stored basic service group code. For the purpose of this paragraph a general bearer service is a member of the corresponding bearer service group.

4.2.1.2.5 Criteria at DP T_Busy and T_No_Answer

The HLR may store a list of up to 5 cause values.

The criteria for a mobile terminating call are checked in the GMSC or in MSC.

For mobile terminating calls in the GMSC, the HLR shall include the trigger criteria in the subscriber data sent to the GMSC. Reason is that the cause code received from ISUP is used in the trigger criteria check. The cause code is not known at the time of sending the T-CSI to the GMSC.
If SRI-Ack includes the Not Reachable FTN, then HLR may decide not to include the trigger criteria, if the HLR has identified that T-CSI includes DP T Busy with cause code Not Reachable.

If SRI-Ack includes the Not Reachable FTN and also T-CSI, including DP T Busy with cause code, then the not reachable condition shall be mapped to an ISUP release code, which shall be used for triggering check.

For Mobile terminating calls in the VMSC, the trigger criteria are received in the VT-CSI from the HLR in Insert Subscriber Data IF. The triggering is based on the ISUP release cause code (call set up result).

The following criteria are applicable for DP T_Busy and T_No_Answer:

- Release cause code

The trigger criteria are met if the cause code received from ISUP or MAP is equal to at least one of the cause codes in the trigger criteria list.

If trigger criteria are satisfied, either in GMSC or VMSC, then the corresponding Service Logic shall be invoked.
If a T-BCSM was already invoked and there is a control relationship at that moment, then no Service Logic shall be invoked.

When a RCH message is received in the GMSC and the subscriber has T-CSI then the forwarding reason in the RCH message shall be used to perform trigger criteria check for DP T Busy or DP T No Answer. If a match is found, then the corresponding Service Logic shall be invoked.
If a T-BCSM was already invoked and there is a relationship at that moment, then no Service Logic shall be invoked.

4.2.1.3 Relationship

Given that an armed DP was encountered, the gsmSSF provides an information flow via a relationship.

A relationship between the gsmSSF and the gsmSCF for the purpose of operator specific service processing is considered to be a CAMEL relationship. There are two types of CAMEL relationships:

- A CAMEL control relationship if the gsmSCF is able to influence the call processing via the relationship.

- A CAMEL monitor relationship if the gsmSCF is not able to influence the call processing via the relationship.

4.2.2 DP processing rules

The gsmSSF shall apply the following set of rules during DP processing to ensure a single point of control:
- EDPs are disarmed by the gsmSSF as they are encountered and reported to the gsmSCF, when the occurrence of another EDP causes the implicit disarming of the EDP or when the leg clears.

- A control relationship persists as long as there is 1 or more EDP-R armed for this portion of the call or if the gsmSSF is in any state except Monitoring or Idle.

- A control relationship changes to a monitor relationship if the control relationship does not persist and :

- 1 or more EDP-N armed, or

- 1 or more Call information Report outstanding, or

- an Apply Charging Report outstanding.

- A control relationship terminates if it does not persist and does not change to a monitor relationship. A monitor relationship terminates if there are neither EDP-Ns armed nor reports outstanding or if the call clears.

3GPP TSG CN WG2
Charleston, SC, USA, 27-31 March 2000

Document **N2A000385**

Revise of N2A000351

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.078 CR **142r1** Current Version: **3.4.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ ↑ *CR number as allocated by MCC support team*

For submission to: **CN#8** for approval **X** strategic ☐ *(for SMG use only)*
list expected approval meeting # here ↑ for information ☐ non-strategic ☐

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: (U)SIM ☐ ME ☐ UTRAN / Radio ☐ Core Network **X**
(at least one should be marked with an X)

Source:	N2	**Date:**	29/03/00
Subject:	Proposed information flow on NSDC		
Work item:	CAMEL Phase 3		

Category: F Correction
(only one category shall be marked with an X)
A Corresponds to a correction in an earlier release
B Addition of feature
C Functional modification of feature **X**
D Editorial modification

Release:
Phase 2 ☐
Release 96 ☐
Release 97 ☐
Release 98 ☐
Release 99 **X**
Release 00 ☐

Reason for change:

In CAMEL Phase 3, Notify Subscriber Data Change operation sends only identifier which indicates call forwarding, call barring, odb or CSI to the gsmSCF.

But in this specification, in the case of call forwarding, the gsmSCF has to interrogate maximum 4 times to the HLR to know what kind of call forwarding data (CFU, CFB, CFNRc or CFNRy) has changed. And in the case of CSI, the gsmSCF has to interrogate maximum 9 times to the HLR. (In the case of CB, the gsmSCF has to interrogate maximum 7 times.)

This specification is not practical, so NTT COMWARE proposes to include changed data to the request of Notify Subscriber Data Change operation.

Clauses affected: 10.3.2.3.2

Other specs affected:
Other 3G core specifications **X** → List of CRs: 29002-122r1
Other GSM core specifications ☐ → List of CRs:
MS test specifications ☐ → List of CRs:
BSS test specifications ☐ → List of CRs:
O&M specifications ☐ → List of CRs:

Other comments:

In Abiko meeting, NTT COMWARE proposed information flow of NSDC, and the proposal was approved. (N2-99C89(bis)) In the proposal, according to the LS below, NSDC request contained changed data. But in the Phoenix meeting, NSDC information flow had changed to the current specification for the reason that sending only identifier is the S1 requirement. (N2-99D83)

However this specification is not practical as described above, and the argument of N2-99D83 is only based on the description of 22.078, so NTT COMWARE re-proposes to include changed data to the request of NSDC.

<LS sent from SMG3 to SMG1(SMG3 3C-189)>

-- quote begins

2. When a data item has changed in the HLR, the HLR can (listis not exhaustive):

-   Notify the gsmSCF about the change and include the new value of thedata item in the operation.

-   Notify the gsmSCF about the change, without including the new value of the data item in the operation.

-   Depending on the NCSD marking for that subscriber, notify gsmSCF and include the new value or notify the gsmSCF without the new value included.

In case of notification without inclusion of the new data value, the gsmSCF can decide whether it wants to interrogate the HLR for the new data item.

SMG3-WPC would like to know if SMG1 has a preference for any of the above alternatives.

-- end

<Liaison back from SMG1(SMG1-99129)>

-- quote begins

2. For reducing the signalling traffic SMG1 supports the first option to notify and to include the new value of the data item in the operation.

-- end

help.doc

<--------- double-click here for help and instructions on how to create a CR.

10.3.2.3 Notify Subscriber Data Change

10.3.2.3.1 Description

This IF is used by the HLR to notify to the gsmSCF of the change of subscriber data.

10.3.2.3.2 Information Elements

The following information elements are required:

Information element name	Required	Description
IMSI	M	The IMSI is used to identify the subscriber.
MSISDN	M	The MSISDN is used to identify the subscriber.
~~Changed Data~~	~~M~~	~~This IE identifies the data that has changed. The data can be one of:~~ ~~— Call Forwarding SS Data~~ ~~— Call Barring SS Data~~ ~~— Operator Determined Barring~~ ~~— CAMEL Suscription Information~~
Call Forwarding SS data	C	This IE is described in a table below.
Call Barring SS data	C	This IE is described in a table below.
Operator Determined Barring data	C	This IE is described in a table below.
CAMEL Subscription Information	C	This IE is described in a table below.

M Mandatory (The IE shall always be sent)

C Conditional (The IE shall be sent, if available)

Call Forwarding SS data contains the following information:

Information element name	Required	Description
SS Code	C	This IE indicates Call Forwarding supplementary service as defined in 3G TS 22.004 [25].
Basic Service	C	See 3G TS 22.002 [24].
SS Status	C	See 3G TS 23.011 [26].
Forwarded-to Number	C	See 3G TS 23.082 [27].
Forwarded-to Subaddress	C	See 3G TS 23.082 [27].
Subscription Options	C	See 3G TS 23.082 [27].
No Reply Condition Time	C	See 3G TS 23.082 [27].
Notification-to-CSE Flag	C	This IE indicates whether the gsmSCF is notified of a change of Call Forwarding SS data.

C Conditional (The IE shall be sent, if available and applicable)

Call Barring SS data contains the following information:

Information element name	Required	Description
SS Code	C	This IE indicates Call Barring supplementary service as defined in 3G TS 22.004 [25].

Basic Service	C	See 3G TS 22.002 [24].
SS Status	C	See 3G TS 23.011 [26].
Password	C	See 3G TS 23.011 [26].
Wrong password attempts counter	C	See 3G TS 23.011 [26].
Notification-to-CSE flag	C	This IE indicates whether the gsmSCF is notified of a change of Call Barring SS data.

C   Conditional (The IE shall be sent, if available and applicable)

Operator determined barring data contains the following information:

Information element name	Required	Description
ODB General Data	C	This IE indicates the set of subscribers features that the network operator or the service provider can regulate.
ODB HPLMN Specific Data	C	This IE indicates the set of subscribers features that the network operator or the service provider can regulate only when the subscriber is registered in the HPLMN.
Notification-to-CSE flag	C	This IE indicates whether the gsmSCF is notified of a change of ODB data.

C   Conditional (The IE shall be sent, if available and applicable)

CAMEL Subscription Information contains the following information:

Information element name	Required	Description
O-CSI	C	See section 4.3.1.
D-CSI	C	See section 4.3.2.
T-CSI	C	See section 4.3.4.
VT-CSI	C	See section 4.3.5.
TIF-CSI	C	See section 4.3.6.2.
GPRS-CSI	C	See section 6.3.1.
SMS-CSI	C	See section 7.3.1.
SS-CSI	C	See section 8.2.1.1.
M-CSI	C	See section 9.2.1.1

C   Conditional (The IE shall be sent, if it was modified and available)

CHANGE REQUEST

23.078 CR **148r1**   Current Version: 3.4.0

For submission to: CN#8   for approval [X]   strategic [ ]
for information [ ]   non-strategic [ ]

Proposed change affects: (U)SIM [ ]   ME [ ]   UTRAN / Radio [ ]   Core Network [X]

Source: N2   **Date:** 23 May 2000

Subject: Usage of GPRS Reference Number

Work item: CAMEL Phase 3

Category:			**Release:**	
	F	Correction	Phase 2	[ ]
	A	Corresponds to a correction in an earlier release	Release 96	[ ]
	B	Addition of feature	Release 97	[ ]
	C	Functional modification of feature [X]	Release 98	[ ]
	D	Editorial modification	Release 99	[X]
			Release 00	

Reason for change:
The SGSN and the SCP make use of the GPRS Reference Number to initiate a new TCAP dialogue for an existing 'logical dialogue'.

The GPRS Reference Number shall consist of an integer assigned by the SGSN and an integer assigned by the SCP. These two numbers together guarantee uniqueness of the GPRS Reference Number for all SGSNs and all SCPs.

At the same time, this approach enables to the SGSN and the SCP to deploy a simple mapping table to link the GPRS Reference Number to an internal Software Process.

Clauses affected: 6.6.1, 6.6.2

Other specs:	Other 3G core specifications	[X]	→ List of CRs:	3G TS 29.078
affected:	Other GSM core specifications	[ ]	→ List of CRs:	
	MS test specifications	[ ]	→ List of CRs:	
	BSS test specifications	[ ]	→ List of CRs:	
	O&M specifications	[ ]	→ List of CRs:	

Other comments:

The concept described in the present CR has been presented at the 3GPP-CN2 meeting in Charleston, USA, 27th - 31st of March 2000, Tdoc N2A000368.

This concept was in principal supported and Ericsson was requested to submit CR's to introduce the concept as formal part of the specification.

The description of the GPRS Reference Number in the various Information Flows in sect. 6.6.1 and sect. 6.6.2 is modified.

The GPRS Reference Number is marked as mandatory in InitialDPGPRS operation. In all other operations that use GPRS Reference Number, it is marked as Conditional.

Note

The Information Flows ContinueGPRS and ConnectGPRS do not need the GPRS Reference Number. Reasons are:

- When ContinueGPRS or ConnectGPRS is the first operation in response to InitialDPGPRS, then the dialogue shall not be maintained, due to pre-arranged end rules (no events armed, no reports outstanding).

- ContinueGPRS and ConnectGPRS can not be used to open a new TCAP dialogue.

The reference to 3G TS 22.024 has also been corrected in this CR.

****	FIRST MODIFIED SECTION	****

6.6.1 gprsSSF to gsmSCF Information Flows

6.6.1.1 Activity Test GPRS Ack

6.6.1.1.1 Description

This IF is the response to the Activity Test GPRS.

6.6.1.1.2 Information Elements

This IF contains no information elements.

6.6.1.2 Apply Charging Report GPRS

6.6.1.2.1 Description

This IF is used by the gprsSSF to report to the gsmSCF the information requested in the Apply Charging GPRS IF. In addition, this IF is used to notify the gsmSCF of user initiated change in QoS. Note that there are several possible QoS profiles defined by the combinations of the different QoS attributes as defined in 3G TS 23.060, see reference [11]. A PLMN may only support and charge on a limited subset of those QoS. It is recommended that changes in QoS are only reported in Apply Charging Report GPRS for those QoS profiles.

6.6.1.2.2 Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	C~~M~~	~~This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.~~ This IE consists of a number assigned by the gprsSSF and a number assigned by the gsmSCF. It is used for TCAP dialogue segmentation. Refer to 3G TS 29.078 [5] for the usage of this element.
Charging Result	M	This IE contains the charging information for the PDP provided by the gsmSSF. It is a choice between elapsed time and data volume.
Quality of Service	C	This IE identifies the QoS requested by the user and granted by the SGSN due to 'Modify PDP Context request. This IE shall only be present if sending of the Apply Charging Report was triggered by a change in Quality of Service.
Active	M	This IE indicates if the GPRS session or PDP context is still established, or if it has been detached or deactivated.
PDP ID	C	This IE identifies the PDP context which the Apply Charging Report is applicable for. If not present the dialogue corresponds to the GPRS session or to one single

		PDP context.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

6.6.1.3   Entity Released GPRS

6.6.1.3.1   Description

This IF is used by the gprsSSF to inform the gsmSCF at any phase that a GPRS session or PDP context has been terminated by the SGSN without reporting any EDP.

6.6.1.3.2   Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	C~~M~~	This IE consists of a number assigned by the gprsSSF and a number assigned by the gsmSCF. It is used for TCAP dialogue segmentation. Refer to 3G TS 29.078 [5] for the usage of this element. ~~This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.~~
GPRS Cause	M	This IE contains the Cause value indicating the reason for discontinuation of the PDP context.
PDP ID	M	This IE identifies the PDP context which has been terminated by the SGSN.

M Mandatory (The IE shall always be sent)
C   Conditional

6.6.1.4   Event Report GPRS

6.6.1.4.1   Description

This IF is used to notify the gsmSCF of a GPRS event (e.g. Attach or Detach) previously requested by the gsmSCF in a Request Report GPRS Event IF.

6.6.1.4.2   Information Elements

The following information elements are required:

Information element name	Required	Description
Gprs Reference Number	C~~M~~	This IE consists of a number assigned by the gprsSSF and a number assigned by the gsmSCF. It is used for TCAP dialogue segmentation. Refer to 3G TS 29.078 [5] for the usage of this element. ~~This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.~~

GPRS Event type	M	This IE specifies the type of event that is reported.
Misc GPRS Info	M	This IE indicates the DP type (EDP-N or EDP-R).
GPRS Event Specific Information	C	This IE contains information specific to the reported event, e.g. new routeing area in case of change of position or charging id in case of PDP Context Establishment Acknowledgement.
PDP ID	C	This IE identifies the PDP context, which the Report GPRS Event is applicable for. If not present the dialogue corresponds to the Attach/Detach FSM or to one single PDP context.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

6.6.1.5   Initial DP GPRS

6.6.1.5.1   Description

This IF is generated by the gprsSSF when a trigger is detected at a DP in the GPRS state machines, to request instructions from the gsmSCF.

6.6.1.5.2   Information Elements

The following information elements are required:

Information element name	Required	Description
Gprs Reference Number	M	This IE consists of a number assigned by the gprsSSF. It is used for TCAP dialogue segmentation. Refer to 3G TS 29.078 [5] for the usage of this element. ~~This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.~~

ServiceKey	M	This IE indicates to the gsmSCF the requested CAMEL Service. It is used to address the required application/SLP within the gsmSCF.
GPRS Event Type	M	This IE indicates the armed GPRS DP event resulting in the Initial Data Event IF.
MSISDN	M	This IE contains the basic MSISDN of the MS.
IMSI	M	This IE identifies the mobile subscriber.
Time and Time zone	M	This IE contains the time that the gprsSSF was triggered, and the time zone the gprsSSF resides in.
GPRS MS Class	C	This IE contains the MS network and radio access capabilities.
PDP Type	C	This IE identifies the PDP Type, e.g. X.25 or IP.
Quality of Service	C	This IE identifies the QoS (subscribed, requested or negotiated).
Access Point Name	C	This IE identifies the address Access Point Name the MS has requested to connect to.
Routeing Area Identity	C	This IE contains the location information of the MS.
Charging ID	C	This IE contains the Charging ID received from the GGSN for the PDP context.
SGSN Capabilities	C	This IE specifies the capabilities of the SGSN node to support the CAMEL interwork, e.g. support of Advice of Charge.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

****   NEXT MODIFIED SECTION   ****

6.6.2   gsmSCF to gprsSSF Information Flows

6.6.2.1   Activity Test GPRS

6.6.2.1.1   Description

This IF is used to check for the continued existence of a relationship between the gsmSCF and gprsSSF. If the relationship is still in existence, then the gprsSSF will respond. If no reply is received, then the gsmSCF will assume that the gprsSSF has failed in some way and will take the appropriate action.

6.6.2.1.2   Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	C~~M~~	This IE consists of a number assigned by the gprsSSF and a number assigned by the gsmSCF. It is used for TCAP dialogue segmentation. Refer to 3G TS 29.078 [5] for the usage of this element. ~~This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.~~

~~M Mandatory (The IE shall always be sent)~~

C Conditional

6.6.2.2   Apply Charging GPRS

6.6.2.2.1   Description

This IF is used for interacting from the gsmSCF with the gprsSSF charging mechanisms to control the charging of a GPRS session or PDP Context.

6.6.2.2.2   Information Elements

Information element name	Required	Description
Gprs Reference Number	C~~M~~	This IE consists of a number assigned by the gprsSSF and a number assigned by the gsmSCF. It is used for TCAP dialogue segmentation. Refer to 3G TS 29.078 [5] for the usage of this element. ~~This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.~~
Charging Characteristics	M	This IE specifies the charging related information to be provided by the gsmSSF and the conditions on which this information has to be provided back to the gsmSCF. It is a choice between granted volume and granted time for the data transfer.
Tariff Switch Interval	O	This information element specifies the time duration until the next tariff switch occurrence.
PDP ID	C	This IE identifies the PDP context, which the Apply GPRS Charging is applicable for. If not present the dialogue corresponds to the GPRS session or to one single PDP context.

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

C Conditional (The IE shall be sent, if available).

6.6.2.3   Cancel GPRS

6.6.2.3.1   Description

This IF is used by the gsmSCF to request the gprsSSF to cancel all EDPs and reports.

6.6.2.3.2   Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	C~~M~~	This IE consists of a number assigned by the gprsSSF and a number assigned by the gsmSCF. It is used for TCAP dialoue segmentation. Refer to 3G TS 29.078 [5] for the usage of this element. ~~This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.~~
PDP ID	C	This IE identifies the PDP context which is to be cancelled. If not present the dialogue corresponds to the GPRS session or to one single PDP context.

~~M   Mandatory (The IE shall always be sent).~~

C   Conditional ~~(The IE shall be sent, if available).~~

6.6.2.4   Connect GPRS

6.6.2.4.1   Description

This IF is used by the gsmSCF to request the gprsSSF to modify the APN used when establishing a PDP Context.

6.6.2.4.2   Information Elements

The following information elements are used:

Information element name	Required	Description
Access Point Name	M	This IE contains the Access Point Name to be used when establishing the PDP Context.
PDP Id	C	This IE identifies the PDP Context where the new Access Point Name shall be used.

M Mandatory (The IE shall always be sent)
C   Conditional

6.6.2.5   Continue GPRS

6.6.2.5.1   Description

This information flow requests the gprsSSF to proceed with processing at the DP at which it previously suspended processing to await gsmSCF instructions. The gprsSSF completes DP processing, and continues processing (i.e., proceeds to the next point in the Attach/Detach FSM or PDP Context FSM) without substituting new data from the gsmSCF.

6.6.2.5.2   Information Elements

The following information element is used:

Information element name	Required	Description
PDP ID	C	This IE identifies the PDP context which processing shall continue for. If not present the dialogue corresponds to the GPRS session or to one single PDP context.

C   Conditional (The IE shall be sent, if available).

6.6.2.6   Furnish Charging Information GPRS

6.6.2.6.1   Description

This IF is used to request the gprsSSF to include information in the CAMEL specific logical call record.

The logical call record is created when FCI-GPRS is received and a logical call record for that FSM does not exist. For modelling purposes the logical call record is buffered in the gprsSSF. The gprsSSF completes logical call records as defined in the SDLs. Once the logical call record is completed, then its free format data is moved to the corresponding CDR and the logical call record is deleted.

In the SGSN there is a separate Logical call record for the attach/detach state model and for each PDP context.

The CSE can send multiple concatenated FCIs per Logical Call Record for completion. The total maximum of free format data is 160 octets per Logical Call Record. The 160 octets may be sent in one or more FCI operations. If there is non-completed free format data and new FCI operation(s) is/are received to overwrite the non-completed data, then the non-completed data is discarded and the gsmSCF can send another 160 octets per CDR.

6.6.2.6.2   Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	C~~M~~	This IE consists of a number assigned by the gprsSSF and a number assigned by the gsmSCF. It is used for TCAP dialogue segmentation. Refer to 3G TS 29.078 [5] for the usage of this element. ~~This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.~~
FCI GPRS Billing Charging Characteristics	M	This IE is described in the next table.

M Mandatory (The IE shall always be sent)
C   Conditional

FCI GPRS Billing Charging Characteristics contains the following information:

Information element name	Required	Description
FCIBCCCAMEL Sequence 1	M	This IE is described in the next table.

M Mandatory (The IE shall always be sent).

FCIBCCCAMEL Sequence 1 contains the following information:

Information element name	Required	Description
Free Format Data	M	This IE is a free format data to be inserted in the CAMEL logical call record.
Append Free Format Data	O	This IE indicates that the gprsSSF shall append the free format data to the Logical call record. In the SGSN there is a separate Logical call record for the attach/detach state model and for each PDP context. - If this IE is present indicating "Append", the gprsSSF shall append the free format data received in this IF to the free format data already present in the Logical call record for that GPRS session or PDP Context. - If this IE is absent or in value "Overwrite", then the gprsSSF shall overwrite all free format data already present in the Logical call record for that GPRS session or PDP Context, by the free format data received in this IF. If no Logical call record exists yet for that GPRS session or PDP Context, then the gprsSSF shall ignore this IE.
PDP Id	C	This IE identifies the PDP context's Logical call record to which the free format data shall be appended or overwritten. If not present, the free format data belong to a Logical call record for a GPRS session or a single PDP context for the dialogue.

M Mandatory (The IE shall always be sent).

O Optimal (Service logic dependent).

C Conditional (The IE shall be sent, if available).

6.6.2.7   Release GPRS

6.6.2.7.1   Description

This IF is used by the gsmSCF to tear down an existing GPRS session or PDP Context at any phase.

6.6.2.7.2   Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	C~~M~~	This IE consists of a number assigned by the gprsSSF and a number assigned by the gsmSCF. It is used for TCAP dialogue segmentation. Refer to 3G TS 29.078 [5] for the usage of this element. ~~This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.~~

| GPRS Cause | M | This IE contains the Cause value indicating the reason for releasing the GPRS session or PDP context. |
| PDP ID | C | This IE identifies the PDP context which shall be released. If not present the dialogue corresponds to the GPRS session or to one single PDP context. |

M   Mandatory (The IE shall always be sent).

C   Conditional (The IE shall be sent, if available).

6.6.2.8   Request Report GPRS Event

6.6.2.8.1   Description

This IF is used to request the gprsSSF to monitor for an event and send a notification back to the gsmSCF when the event is detected (see Event Report Data).

6.6.2.8.2   Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	C~~M~~	This IE consists of a number assigned by the gprsSSF and a number assigned by the gsmSCF. It is used for TCAP dialogue segmentation. Refer to 3G TS 29.078 [5] for the usage of this element. ~~This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.~~
GPRS Event	M	This IE specifies the event or events of which a report is requested.
PDP ID	C	This IE identifies the PDP context, which the Request Report GPRS Event is applicable for. If not present the dialogue corresponds to the GPRS session or to one single PDP context.

M   Mandatory (The IE shall always be sent).

C   Conditional (The IE shall be sent, if available).

Data Event contains the following information:

Information element name	Required	Description
GPRS Event type	M	This IE specifies the type of event of which a report is requested.
Monitor Mode	M	This IE indicates how the event shall be reported.

M   Mandatory (The IE shall always be sent).

6.6.2.9   Reset Timer GPRS

6.6.2.9.1   Description

This IF is used to refresh the gprsSSF timer.

6.6.2.9.2   Information Elements

The following information elements are required:

Information element name	Required	Description
Gprs Reference Number	C	This IE consists of a number assigned by the gprsSSF and a number assigned by the gsmSCF. It is used for TCAP dialogue segmentation. Refer to 3G TS 29.078 [5] for the usage of this element.
Timer ID	M	This IE specifies the default value for the Tssf timer.
Timer Value	M	This IE specifies the value to which the timer Tssf shall be set.
PDP ID	C	This IE identifies the PDP context, which the Reset of the timer is applicable for. If not present the dialogue corresponds to the GPRS session or to one single PDP context.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

6.6.2.10   Send Charging Information GPRS

6.6.2.10.1   Description

This IF is used to send e-parameters from the gsmSCF to the gprsSSF. If charge advice information is received from the gsmSCF, it shall replace the charge advice information which would be generated by the SGSN and inhibit any further generation of CAI by the SGSN. Further processing of the charge advice information by the SGSN shall be in accordance with the GSM Advice of Charge Supplementary Service.

NOTE: If charge advice information is received from the gsmSCF after charge information has been generated by the SGSN and sent to the MS, the behaviour of the service may be unpredictable or incorrect; the service designer should therefore ensure that the first set of charge advice information is sent to the gprsSSF before charge information is sent to the to the MS.

6.6.2.10.2   Information Elements

The following information elements are required:

Information element name	Required	Description
Gprs Reference Number	C~~M~~	This IE consists of a number assigned by the gprsSSF and a number assigned by the gsmSCF. It is used for TCAP dialogue segmentation. Refer to 3G TS 29.078 [5] for the usage of this element. ~~This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.~~

SCI GPRS Billing ChargingCharacteristics	M	This IE defines the Advice Of Charge related information to be provided to the Mobile Station, if supported by the SGSN.

M Mandatory (The IE shall always be sent)
C Conditional

GPRS SCI Billing Charging Characteristics is defined as:

Information element name	Required	Description
AOC GPRS	M	This IE is sent after an Activate PDP Context Accept or Attach Accept has been received from the SGSN. This IE defines the Advice Of Charge related information to be provided to the Mobile Station, if supported by the SGSN.
PDP Id	C	This IE is included if the AoC is applicable to a PDP context. If not present the AoC is applicable to the GPRS session or for a single PDP context for the dialogue.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

AOC GPRS is defined as:

Information element name	Required	Description
AOC Initial	M	This IE contains CAI elements as defined in 3G TS 22.024 [31*].
AOC Subsequent	O	See definition in the next table.

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

AOC Subsequent is defined as:

Information element name	Required	Description
CAI Elements	M	This IE contains CAI elements as defined in 3G TS 22.024 [31*].
Tariff Switch Interval	O	This IE indicates the tariff switch time until the next tariff switch applies.

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

****   END OF DOCUMENT   ****