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Contents

Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x   the first digit:

     1   presented to TSG for information;

     2   presented to TSG for approval;

     3   or greater indicates TSG approved document under change control.

y   the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z   the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

Structure of the OSA API Mapping (3GPP TR 29.998)

The present document is part 8 of a multi-part deliverable covering the Open Service Access (OSA); Application Programming Interface (API) Mapping for OSA.

Table: Overview of the OSA APIs & Protocol Mappings 29.198 & 29.998-family

OSA API specifications 29.198-family						OSA API Mapping - 29.998-family	
29.198-01	Overview					29.998-01	Overview
29.198-02	Common Data Definitions					*29.998-02*	*Not Applicable*
29.198-03	Framework					*29.998-03*	*Not Applicable*
Call Control (CC) SCF	29.198-04-1 Common CC data definitions	29.198-04-2 Generic CC SCF	29.198-04-3 Multi-Party CC SCF	29.198-04-4 Multi-media CC SCF	29.198-04-5 Conf. CC SCF	29.998-04-1	Generic Call Control – CAP mapping
						29.998-04-2	*Generic Call Control – INAP mapping*
						29.998-04-3	*Generic Call Control – Megaco mapping*
						29.998-04-4	Multiparty Call Control – ISC mapping
29.198-05	User Interaction SCF					29.998-05-1	User Interaction – CAP mapping
						29.998-05-2	*User Interaction – INAP mapping*
						29.998-05-3	*User Interaction – Megaco mapping*
						29.998-05-4	User Interaction – SMS mapping
29.198-06	Mobility SCF					29.998-06-1	User Status and User Location – MAP mapping
						29.998-06-2	User Status and User Location – SIP mapping
29.198-07	Terminal Capabilities SCF					*29.998-07*	*Not Applicable*
29.198-08	Data Session Control SCF					**29.998-08**	**Data Session Control – CAP mapping**
29.198-09	*Generic Messaging SCF*					29.998-09	*Not Applicable*
29.198-10	Connectivity Manager SCF					*29.998-10*	*Not Applicable*
29.198-11	Account Management SCF					*29.998-11*	*Not Applicable*
29.198-12	Charging SCF					*29.998-12*	*Not Applicable*
29.198-13	Policy Management SCF					*29.998-13*	*Not Applicable*
29.198-14	Presence & Availability Management SCF					*29.998-14*	*Not Applicable*
29.198-15	Multi Media Messaging SCF					*29.998-15*	*Not Applicable*
29.198-16	Service Broker SCF					*29.998-16*	*Not Applicable*

1 Scope

The present document investigates how the OSA Data Session Control Interface Class methods defined in 3GPP TS 29.198-8 [5] can be mapped onto CAMEL Application Part operations and Mobile Application Part operations.

The mapping of the OSA API to the CAP and relevant MAP operations is considered informative, and not normative. An overview of the mapping TR is contained in the introduction of the present document as well as in 3GPP TR 29.998-1 [10].

The OSA specifications define an architecture that enables application developers to make use of network functionality through an open standardised interface, i.e. the OSA APIs. The API specification is contained in the 3GPP TS 29.198 series of specifications. An overview of these is available in the introduction of the present document as well as in 3GPP TS 29.198-1 [1]. The concepts and the functional architecture for the Open Service Access (OSA) are described by 3GPP TS 23.198 [3]. The requirements for OSA are defined in 3GPP TS 22.127 [2].

2 References

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1]   3GPP TS 29.198-1: "Open Service Access (OSA); Application Programming Interface (API); Part 1: Overview".

[2]   3GPP TS 22.127: "Service Requirement for the Open Services Access (OSA); Stage 1".

[3]   3GPP TS 23.198: "Open Service Access (OSA); Stage 2".

[4]   3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[5]   3GPP TS 29.198-8: "Open Service Access (OSA); Application Programming Interface (API); Part 8: Data session control".

[6]   3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[7]   3GPP TS 29.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL); CAMEL Application Part (CAP) specification".

[8]   3GPP TS 22.101: "Service Aspects; Service Principles".

[9]   ITU-T Recommendation Q.850: "Usage of cause and location in the Digital Subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN User Part".

[10]   3GPP TR 29.998-1: "Open Service Access (OSA); Application Programming Interface (API) Mapping for OSA; Part 1: General Issues on API Mapping".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TS 29.198-1 [1] apply.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TS 29.198-1 [1] apply.

4 Data Session Control Service CAMEL Call Flows

4.1 Data Session Manager

The session manager interface provides the management functions to the data session service capability features. The application programmer can use this interface to enable or disable data session-related event notifications.

In order to ensure that the mobility events are transparent to the Data Session SCF, the same gsmSCF address shall be used in the GPRS-CSI for the detection points: PDP Context Establishment, PDP Context Establishment Acknowledge and Change of Position.

4.1.1 enableDataSessionNotification

enableDataSessionNotification is used to enable data session-related notifications to be sent to the application.
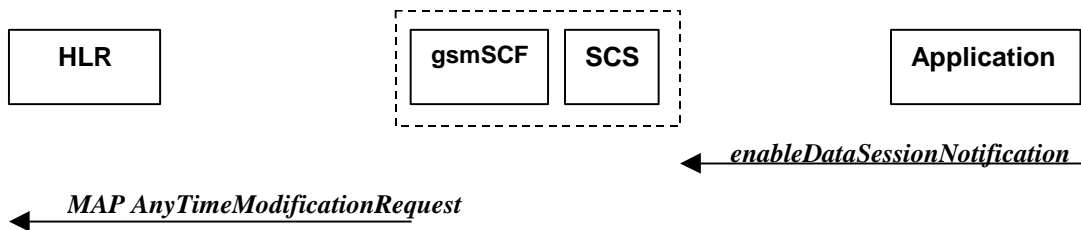

Figure 4-1: Call Flow for enableDataSessionNotification

Table 4-1: Normal Operation

Pre-conditions	An agreement is established between the network operator and the service provider for the event notification to be enabled
1	The application invokes the **enableDataSessionNotification** method
2	The gsmSCF sends a MAP **AnyTimeModification** to the HLR in order to activate the necessary CAMEL Subscription Information (GPRS-CSI) Note : CAMEL phase 3 only allows for activation/deactivation of the CSI and not modification of the contents of the CSIs

Table 4-2: Parameter Mapping

From: enableDataSessionNotification	To: MAP AnyTimeModification
appInterface	
eventCriteria	GPRS CAMEL Subscription Information GPRS-CSI
OriginatingAddress	gsmSCF Address
assignmentID	

4.1.2 disableDataSessionNotification

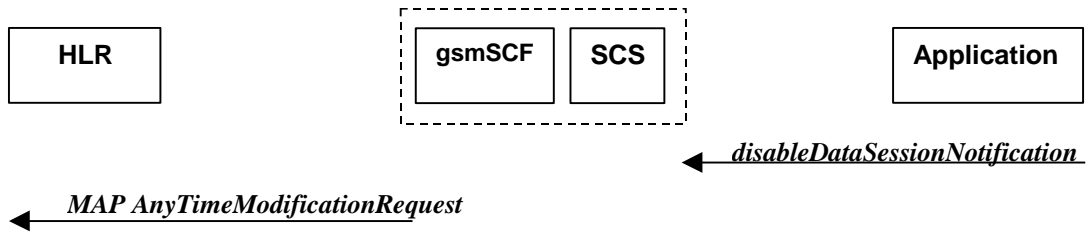*disableDataSessionNotification* is used by the application to disable data session notifications.

Figure 4-2: Call Flow for disableDataSessionNotification

Table 4-3: Normal Operation

Pre-conditions	An agreement is established between the network operator and the service provider for the event notification to be disabled
1	The application invokes the *disableDataSessionNotification* method
2	The gsmSCF sends a MAP *AnyTimeModification* to the HLR in order to de-activate the necessary CAMEL Subscription Information. Note that CAMEL Phase 3 only allows the capability to activate/deactivate CSI and not to modify the triggering information

Table 4-4: Parameter Mapping

From: disableDataSessionNotification	To: MAP AnyTimeModification
eventCriteria	GPRS CAMEL Subscription Information GPRS-CSI
OriginatingAddress	gsmSCF Address
assignmentID	

4.1.3   dataSessionEventNotify

dataSessionEventNotify notifies the application of the arrival of a data session-related event.
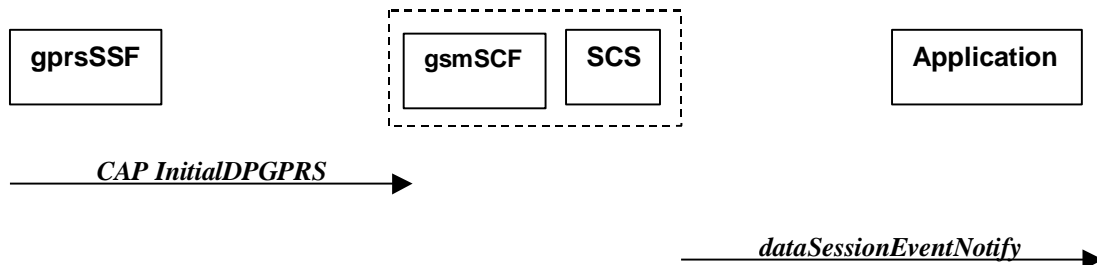
Figure 4-3: Call Flow for dataSessionEventNotify

Table 4-5: Normal Operation

Pre-conditions	Call notifications have been enabled using the *enableDataSessionNotification* **method on the Data Session Manager interface**
1	A data session request arrives at the gsmSSF causing initial triggering to the gsmSCF CAP *InitialDPGPRS*
2	The gsmSCF recognizes the need for an API service and passes the triggering information to the SCS
3	The SCS identifies the application responsible for handling the data session and invokes the *dataSessionEventNotify* method

Table 4-6: Parameter Mapping

From: CAP InitialDPGPRS	To: dataSessionIEventNotify
serviceKey	
gPRSEventType	
mSISDN	eventInfo
accessPointName	OriginatingAddress
	DestinationAddress
iMSI	
timeAndTimeZone	
gPRSMSClass	
pDPType	
qualityOfService	
routeingAreaIdentity	
chargeID	
sGSNCapabilities	
	assignmentID
	appInterface

4.1.4 dataSessionAborted

dataSessionAborted indicates to the application that the Data Session object has aborted or terminated abnormally. No further communication will be possible between the Data Session object and the application.
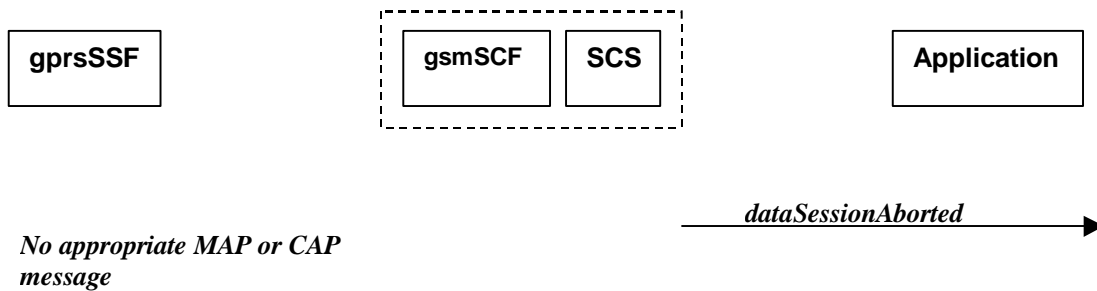

Figure 4-4: Call Flow for dataSessionAborted

Table 4-7: Normal Operation

Pre-conditions	
1	The SCS detect a catastrophic failure in its communication with the gsmSCF
2	The SCS, invokes the *dataSessionAborted* method. The data session running in the network may continue and will not have been affected by this failure betweeen the gsmSCF and the SCS

Parameter Mapping

None.

4.1.5 dataSessionNotificationInterrupted

dataSessionlNotificationInterrupted indicates to the application that event notifications will no longer be sent (for example, due to faults detected).
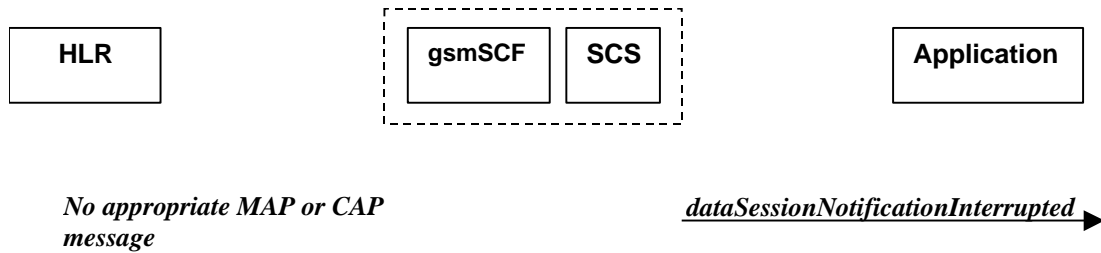
Figure 4-5: Call Flow for dataSessionNotificationInterruptedNormal Operation

Table 4-8

Pre-conditions	Data session notifications have been enabled using the *enableNotification* method on the Data Session Manager interface
1	The SCS has detected, or has been informed of, a fault which prevents further events from being notified
2	The SCS invokes the ***dataSessionNotificationInterrupted*** method

Parameter Mapping

None.

4.1.6 dataSessionNotificationContinued

dataSessionNotificationContinued indicates to the application that all event notifications will be sent again.
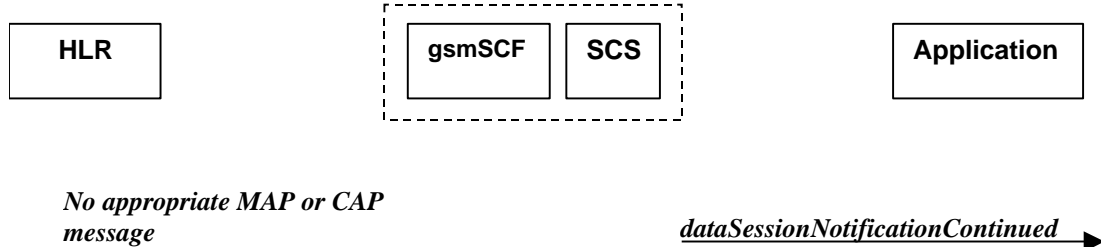
Figure 4-6: Call Flow for dataSessionNotificationContinued

Table 4-9: Normal Operation

Pre-conditions	Data session notifications have been interrupted and *dataSessionNotificationInterrupted* method has been invoked
1	The SCS detects that data session notifications are again possible
2	The SCS invokes the ***dataSessionNotificationContinued*** method

Parameter Mapping

None.

4.2 Data Session

The Data Session interface provides basic methods for applications to control data sessions.

4.2.1 ConnectReq

connectReq requests the connection of a data session with the destination party (specified in the parameter TargetAddress). The Data Session object is not automatically deleted if the destination party disconnects from the data session. The mapping to *continueGPRS* is also possible.
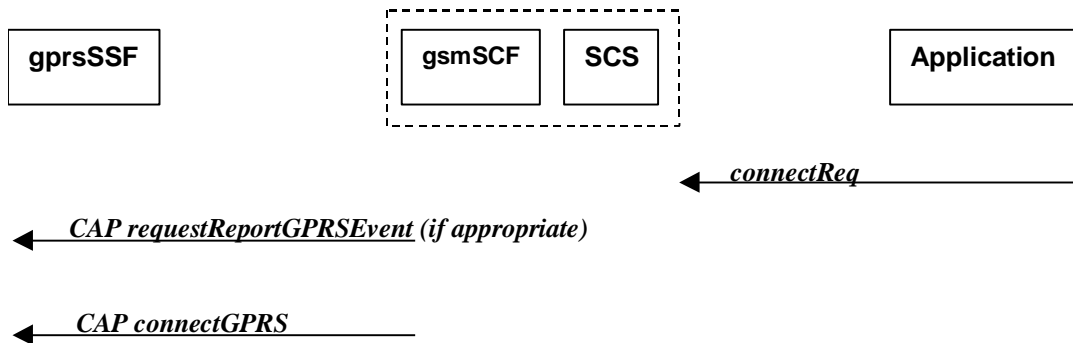

Figure 4-7: Call Flow for connectReq

Table 4-10: Normal Operation

Pre-conditions	The application has been notified of a new data session and the data session object exists
1	The application invokes the **connectReq** method
2	The SCS sends an equivalent internal message to the gsmSCF
3	The gsmSCF sends a CAP **requestReportGPRSEvent** if the application needs to be informed about the outcome of the request
4	The gsmSCF sends a CAP **connectGPRS** message

Table 4-11: Parameter Mapping

From: connectReq	To: CAP requestReportGPRSEvent
	gPRS-ReferenceNumber
dataSessionID	
responseRequested	gPRSEvent
targetAddress	
	pDPID
assignmentID	

Table 4-12

From: connectReq	To: CAP connectGPRS
dataSessionID	
responseRequested	
targetAddress	accessPointName
	pdpID
assignmentID	

4.2.2 connectRes

connectRes indicates that the request to connect a data session with the destination party was successful, and indicates the response of the destination party (e.g. connected, disconnected).
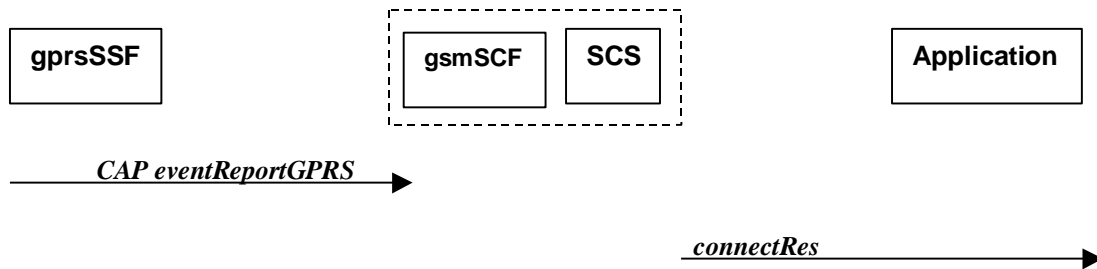
Figure 4-8: Call Flow for connectRes

Table 4-13: Normal Operation

Pre-conditions	Data session routing attempted
1	If event reports have been requested, the gprsSSF sends a CAP ***eventReportGPRS*** to the gsmSCF
2	The gsmSCF sends an equivalent message to the SCS
3	The SCS invokes the ***connectRes*** method

Table 4-14: Parameter Mapping

From: CAP eventReportGPRS	To: connectRes
	dataSessionID
gPRS-ReferenceNumber	
gPRSEventType miscGPRSInfo gPRSEventSpecificInformation	eventReport
pDPID	

4.2.3 connectErr

connectErr indicates that the request to connect a data session with the destination party was unsuccessful, e.g. an error detected in the network or the data session was abandoned.
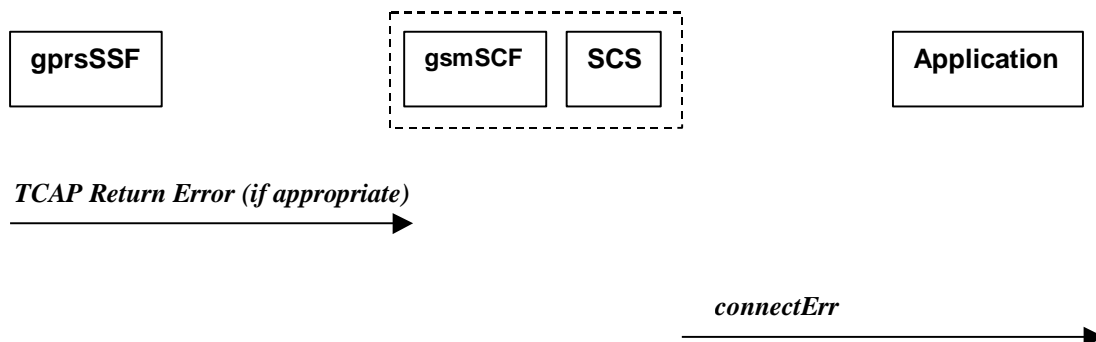
Figure 4-9: Call Flow for connectErr

Two scenarios are possible:

1. The gsmSCF receives a message from the gprsSSF indicating an error (see table 4-15).

2. The gsmSCF detects there is an error in the message from the SCS (see table 4-16).

Table 4-15: Normal Operation

Pre-conditions	Data session routing attempted
1	The gprsSSF detects a call routing failure and sends an appropriate TCAP message returning an error to the gsmSCF
2	The gsmSCF sends an equivalent message to the SCS
3	The SCS detects an error with the *connectReq* method, or receives a TCAP Return Error, and invokes the *connectErr* method

Table 4-16

Pre-conditions	Data session routing attempted
1	The gsmSCF detects an error in the parameters of the internal message from the SCS requesting a *connectReq*
2	The gsmSCF sends an equivalent message to the SCS
3	The SCS invokes the *connectErr* method

Table 4-17: Parameter Mapping

From: TCAP Return Error	To: routeCallToDestinationErr
	dataSessionID
TC-U-ERROR TC-U-REJECT	errorIndication

4.2.4 release

release requests the release of the data session.

gprsSSF		gsmSCF	SCS		Application

release
←
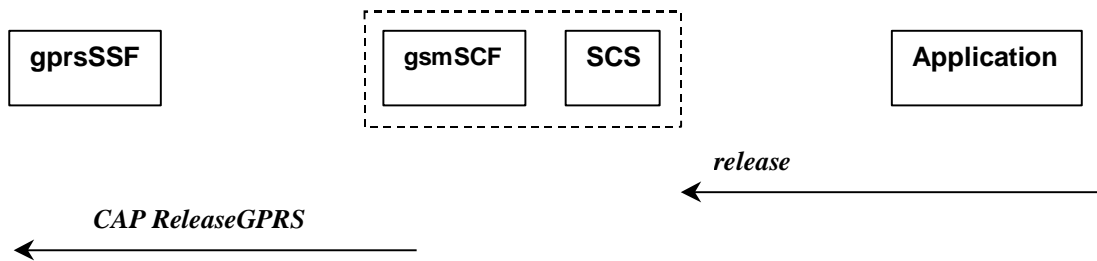
CAP ReleaseGPRS
←

Figure 4-10: Call Flow for release

Table 4-18: Normal Operation

Pre-conditions	Data session is in progress
1	The application invokes the *release* method
2	The SCS sends an equivalent message to the gsmSCF
3	The gsmSCF invokes the CAP *ReleaseGPRS* operation

Table 4-19: Parameter Mapping

From: release	To: CAP ReleaseGPRS
dataSessionID	
	gPRS-ReferenceNumber
cause	gPRSCause
	pDPID

4.2.5 superviseDataSessionReq

superviseDataSessionReq is called by the application to supervise a data session. The application can set a granted data volume for this data session. If an application calls this function before it calls a `connectReq()` or a user interaction function the time measurement will start as soon as the data session is connected. The Data Session object will exist after the data session has been terminated if information is required to be sent to the application at the end of the data session.
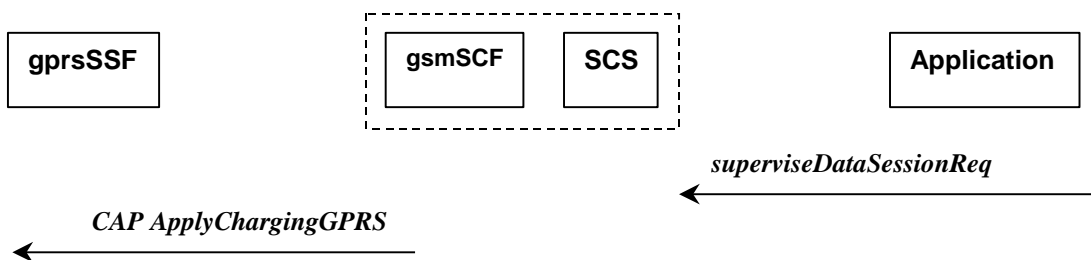

Figure 4-11: Call Flow for superviseDataSessionReq

Table 4-20: Normal Operation

Pre-conditions	
1	The application invokes the *superviseDataSessionReq* method
2	The SCS sends an equivalent internal message to the gsmSCF
3	The gsmSCF sends a CAP ApplyChargingGPRS message to the gprsSSF

Table 4-21: Parameter Mapping

From: superviseDataSessionReq	To: CAP ApplyChargingGPRS
dataSessionID	
	gPRS-ReferenceNumber
treatment	
bytes	chargingCharacteristics maxTransferedVolume
	pDPID

4.2.6 superviseDataSessionRes

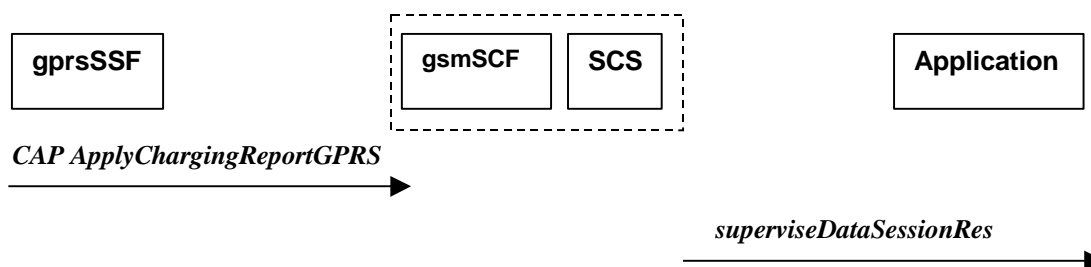*superviseDataSessionRes* is an asynchronous method that reports a data session supervision event to the application.

Figure 4-12: Call Flow for superviseDataSessionRes

Table 4-22: Normal Operation

Pre-conditions	The application has invoked the *superviseDataSessionReq* **method**
1	The gsmSCF receives an CAP **ApplyChargingReportGPRS** from the gprsSSF
2	The gsmSCF sends an equivalent internal message to the SCS
3	The SCS identifies the correct application and invokes the **superviseDataSessionRes** method

Table 4-23: Parameter Mapping

From: CAP ApplyChargingReportGPRS	To: superviseDataSessionRes
	dataSessionID
gPRSReferenceNumber	
	report
chargingResult transferedVolume	usedVolume
qualityOfService	
pDPID	
active	

4.2.7   superviseDataSessionErr

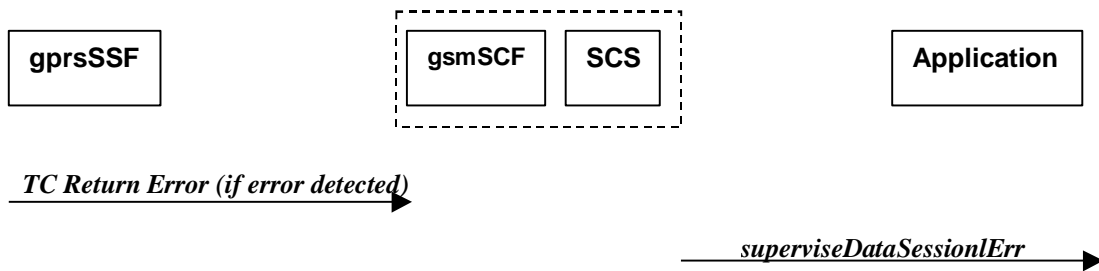*superviseDataSessionErr* is an asynchronous method that reports a data session supervision error to the application.

Figure 4-13: Call Flow for superviseDataSessionErr

Table 4-24: Normal Operation

Pre-conditions	The application has requested information associated with a call via the *superviseDataSessionReq* **method**
1	A data session terminates abnormally and the gprsSSF sends an error in a TCAP message to the gsmSCF, or aborts the TCAP dialogue
2	The gsmSCF sends an equivalent message to the SCS
3	The SCS identifies the correct applications that requested the data session information and invokes the **superviseDataSessionErr** method

Table 4-25: Parameter Mapping

From: TCAP Return Error	To: superviseCallErr
	dataSessionID

TC Primitives
    TC-U-ABORT
    TC-P-ABORT
    TC-NOTICE
    TC-U-ERROR
    TC-L-CANCEL
    TC-U-CANCEL
    TC-L-REJECT
    TC-R-REJECT
    TC-U-REJECT
	error

4.2.8 dataSessionFaultDetected

dataSessionFaultDetected indicates to the application that a fault in the network has been detected which can't be communicated by a network event, e.g. when the user aborts before any establishment method is called by the application.

The system purges the Data Session object. Therefore, the application has no further control of data session processing. No report will be forwarded to the application.
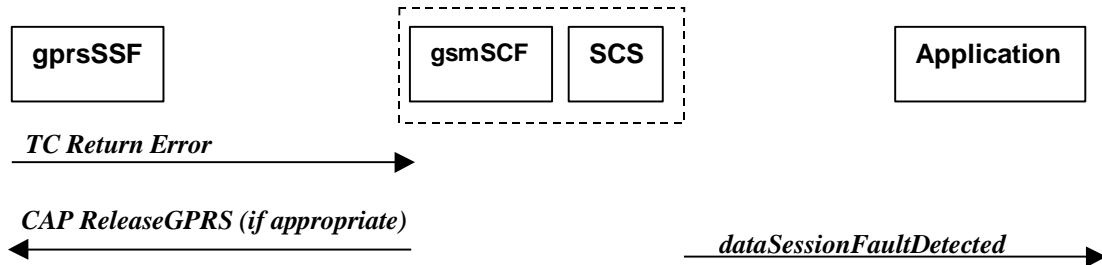

Figure 4-14: Call Flow for dataSessionFaultDetected

Table 4-26: Normal Operation

Pre-conditions	A data session exists and the SCS detects an error. No *connectReq* method has been invoked yet.
1	The gprsSSF may detect a fault and sends an appropriate dialogue error message to the gsmSCF
2	The gsmSCF may detect a fault an send an error message to the SCS
3	The SCS detects a fault and invokes the ***dataSessionFaultDetected*** method
4	The SCS sends an equivalent message to the gsmSCF if appropriate
5	The gsmSCF sends a CAP ***ReleaseGPRS*** if appropriate

Table 4-27: Parameter Mapping

From: Dialogue Error	To: dataSessionFaultDetected
	dataSessionID
TC_U_ABORT	fault

4.2.9 setAdviceOfCharge

setAdviceOfCharge is a method that allows the application to determine the charging information that will be send to the end-users terminal.
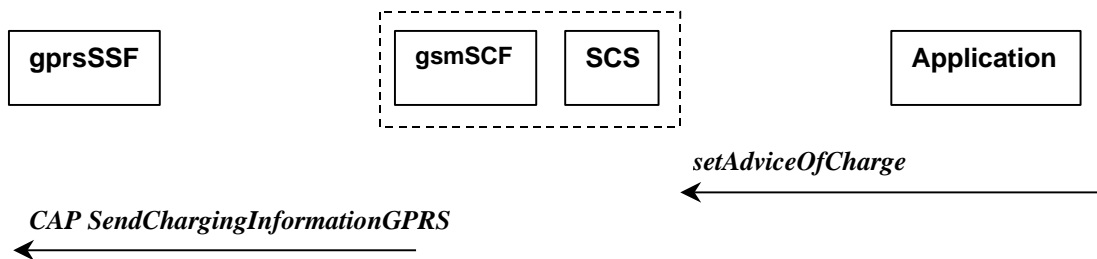
Figure 4-15: Call Flow for setAdviceOfCharge

Table 4-28: Normal Operation

Pre-conditions	
1	The application invokes the ***setAdviceOfCharge*** method
2	The SCS sends an equivalent internal message to the gsmSCF
3	The gsmSCF sends a CAP ***SendChargingInformationGPRS*** message to the gprsSSF

Table 4-29: Parameter Mapping

From: setAdviceOfCharge	To: CAP SendChargingInformationGPRS
sessionID	

aOCInfo:
  -   CurrentCAI
	SCIGPRSBillingChargingCharateristics
	   aOCGPRS
	      aOCInitial

- NextCAI	SCIGPRSBillingChargingCharateristics
	   aOCGPRS
	      aOCSubsequent
	         cAI-GSM0224

tariffSwitch	SCIGPRSBillingChargingCharateristics
	   aOCGPRS
	      aOCSubsequent
	        tariffSwitchInterval

	SCIGPRSBillingChargingCharateristics
	   aOCGPRS
	      pDPID

4.2.10   setDataSessionChargePlan

setDataSessionChargePlan is a method that allows the application to include charging information for data sessions in network generated CDR.
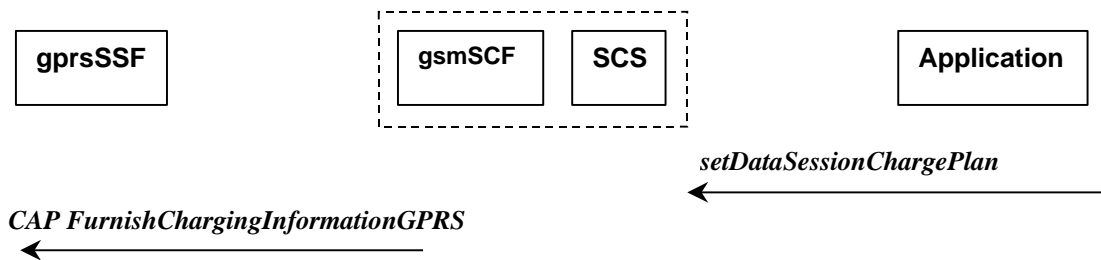

Figure 4-16: Call Flow for setDataSessionChargePlan

Table 4-30: Normal Operation

Pre-conditions	
1	The application invokes the **setDataSessionChargePlan**
2	The SCS sends an equivalent internal message to the gsmSCF
3	The gsmSCF sends a CAP **FurnishChargingInformationGPRS** message to the gprsSSF

Table 4-31: Parameter Mapping

From: setDataSessionPlan	To: CAP FurnishChargingInformationGPRS
dataSessionID	

dataSessionChargePlan	FCIGPRSBillingChargingCharacteritics
	   fCIBCCCAMELsequence1
	      freeFormatData

	FCIGPRSBillingChargingCharacteritics
	   fCIBCCCAMELsequence1
	      appendFreeFormatData

	FCIGPRSBillingChargingCharacteritics
	   fCIBCCCAMELsequence1
	      pDPID

Annex A:
Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Mar 2001	CN_11	NP-010131	011	-	CR 29.998: for moving TR 29.998 from R99 to Rel 4 (N5-010159)	3.2.0	4.0.0
Jun 2002	CN_16	--	--	--	Automatically upgraded to Rel-5 (i.e. no change/CR). The overview of the enlarged 29.198/29.998-family was updated in the Introduction.	4.0.0	5.0.0
Dec 2004	CN_26	--	--	--	Automatically upgraded to Rel-6 (i.e. no change/CR). The overview of the enlarged 29.198/29.998-family was updated in the Introduction.	5.0.0	6.0.0
Mar 2007	CT_35	--	--	--	Automatic upgrade to R7 (no CR needed)	6.0.0	7.0.0
Dec 2008	CT_42	--	--	--	Upgraded unchanged from Rel-7	7.0.0	8.0.0
2009-12	-	-	-	-	Update to Rel-9 version (MCC)	8.0.0	9.0.0