

Technical Specification Group Services and System Aspects TSGS#27(05)0105
Meeting #27, 14 - 17 March 2005, Tokyo, Japan

Source: TSG SA WG2
Title: CR(s) to 23.060
Agenda item: 7.2.3
Document for: APPROVAL

S2 Tdoc	Title	Spec	CR	Rev	Cat	C_Ver	Rel	WI
S2-050402	Update of IETF related references	23.060	519	1	F	6.7.0	Rel-6	TEI6
S2-050400	Redirection in network sharing	23.060	522	2	F	6.7.0	Rel-6	NTShar
S2-050435	RIM-NACC clean up	23.060	523	2	F	5.9.0	Rel-5	TEI6
S2-050436	RIM-NACC clean up	23.060	524	2	F	6.7.0	Rel-6	TEI6
S2-050336	Correction of Packet Flow ID Allocation	23.060	525	1	F	5.9.0	Rel-5	TEI6
S2-050337	Correction of Packet Flow ID Allocation	23.060	526	1	A	6.7.0	Rel-6	TEI6

CHANGE REQUEST

⌘ **23.060 CR 519** ⌘ rev **1** ⌘ Current version: **6.7.0** ⌘

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:	⌘ Update of IETF related references		
Source:	⌘ 3GPP TSG_SA WG2		
Work item code:	⌘ TEI6	Date:	⌘ 30/01/2005
Category:	⌘ F	Release:	⌘ Rel-6
	Use <u>one</u> 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 <u>one</u> of the following releases: Ph2 (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) Rel-7 (Release 7)

Reason for change:	⌘ RFC 2002 is obsoleted by RFC 3344, therefore the references should be updated accordingly.
Summary of change:	⌘ Reference to obsoleted RFC 2002 is replaced by RFC 3344.
Consequences if not approved:	⌘ Reference to obsoleted RFC 2002 in TS 23.060.

Clauses affected:	⌘ 2, 5.7, 9.2.1										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;"></td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;">X</td> </tr> </table> Other core specifications	Y	N	X			X		X	⌘ 29.061	
Y	N										
X											
	X										
	X										
Other comments:	⌘										

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- 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.

2 References

The following documents contain provisions, which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) 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] GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".
- [2] GSM 01.61: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); GPRS ciphering algorithm requirements".
- [3] 3GPP TS 22.060: "General Packet Radio Service (GPRS); Service description; Stage 1".
- [4] 3GPP TS 23.003: "Numbering, addressing and identification".
- [5] 3GPP TS 23.007: "Restoration procedures".
- [5b] 3GPP TS 23.016: "Subscriber data management; Stage 2".
- [6] GSM 03.20: "Digital cellular telecommunications system (Phase 2+); Security related network functions".
- [7] GSM 03.22: "Digital cellular telecommunications system (Phase 2+); Functions related to Mobile Station (MS) in idle mode and group receive mode".
- [7b] 3GPP TS 23.122: "Non-Access Stratum functions related to Mobile Station (MS) in idle mode".
- [8] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".
- [8b] 3GPP TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3 - Stage 2".
- [9] 3GPP TS 21.905: "Vocabulary for 3GPP Specifications", (Release 4).
- [10] Void.
- [11] GSM 03.64: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Overall description of the GPRS radio interface; Stage 2".
- [12] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".
- [13] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols; Stage 3".
- [13b] 3GPP TS 24.011: "Point to Point (PP) Short Message Service (SMS) support on mobile radio interface".
- [14] GSM 04.60: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol".
- [15] GSM 04.64: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station – Serving GPRS Support Node (MS-SGSN) Logical Link Control (LLC) layer specification".

- [16] GSM 04.65: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station (MS) – Serving GPRS Support Node (SGSN); Subnetwork Dependent Convergence Protocol (SNDCCP)".
- [16b] GSM 05.08: "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control".
- [17] 3GPP TS 27.060: "Packet Domain; Mobile Station (MS) supporting Packet Switched services".
- [18] GSM 08.08: "Digital cellular telecommunications system (Phase 2+); Mobile-services Switching Centre - Base Station System (MSC-BSS) interface; Layer 3 specification".
- [19] GSM 08.14: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN) interface; Gb interface layer 1".
- [20] GSM 08.16: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN) interface; Network Service".
- [21] GSM 08.18: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)".
- [22] GSM 08.60: "Digital cellular telecommunications system (Phase 2+); In-band control of remote transcoders and rate adaptors for Enhanced Full Rate (EFR) and full rate traffic channels".
- [23] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".
- [24] 3GPP TS 29.016: "General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) - Visitors Location Register (VLR); Gs interface network service specification".
- [25] 3GPP TS 29.018: "General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) - Visitors Location Register (VLR); Gs interface layer 3 specification".
- [26] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".
- [27] 3GPP TS 29.061: "Interworking between the Public Land Mobile Network (PLMN) supporting Packet Based services and Packet Data Networks (PDN)".
- [27b] 3GPP TS 29.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3; CAMEL Application Part (CAP) Specification".
- [28] GSM 11.11: "Digital cellular telecommunications system (Phase 2+); Specification of the Subscriber Identity Module - Mobile Equipment (SIM-ME) interface".
- [29] ITU-T Recommendations I.130: "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [30] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".
- [31] ITU-T Recommendation Q.65: "The unified functional methodology for the characterization of services and network capabilities".
- [32] ITU-T Recommendation V.42bis: "Data compression procedures for data circuit-terminating equipment (DCE) using error correction procedures".
- [33] ITU-T Recommendation X.3: "Packet assembly/disassembly facility (PAD) in a public data network".
- [34] ITU-T Recommendation X.25: "Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".
- [39] RFC 768 (1980): "User Datagram Protocol" (STD 6).

- [40] RFC 791 (1981): "Internet Protocol" (STD 5).
- [41] RFC 792 (1981): "Internet Control Message Protocol" (STD 5).
- [42] RFC 793 (1981): "Transmission Control Protocol" (STD 7).
- [43] RFC 1034 (1987): "Domain names – concepts and facilities" (STD 13).
- [44] RFC 1661 (1994): "The Point-to-Point Protocol (PPP)" (STD 51).
- [45] RFC 1542 (1993): "Clarifications and Extensions for the Bootstrap Protocol".
- [46] RFC ~~2002~~[3344](#) (~~1996~~[2002](#)): "IP Mobility Support".
- [47] RFC 2131 (1997): "Dynamic Host Configuration Protocol".
- [48] RFC 2460 (1998): "Internet Protocol, Version 6 (IPv6) Specification".
- [49] TIA/EIA-136 (1999): "TDMA Cellular / PCS"; Arlington: Telecommunications Industry Association.
- [50] 3GPP TS 25.301: "Radio Interface Protocol Architecture".
- [51] 3GPP TS 25.303: "Interlayer procedures in Connected Mode".
- [51b] 3GPP TS 25.304: "UE Procedures in Idle Mode and Procedures for Call Reselection in Connected Mode".
- [52] 3GPP TS 25.331: "RRC Protocol Specification".
- [53] 3GPP TS 25.401: "UTRAN Overall Description".
- [54] 3GPP TS 23.121: "Architectural Requirements for Release 1999".
- [55] 3GPP TS 25.322: "RLC protocol specification".
- [56] 3GPP TS 25.412: "UTRAN Iu Interface Signalling Transport".
- [56b] 3GPP TS 25.413: "UTRAN Iu Interface RANAP Signalling".
- [57] 3GPP TS 25.323: "Packet Data Convergence Protocol (PDCP) specification".
- [58] 3GPP TS 23.107: "Quality of Service (QoS) concept and architecture".
- [59] ITU-T Recommendation I.361: "B-ISDN ATM layer specification".
- [60] 3GPP TS 25.321: "Medium Access Control (MAC) protocol specification".
- [61] 3GPP TS 33.102: "3G Security; Security architecture".
- [62] 3GPP TS 22.002: "Circuit Bearer Services (BS) supported by a Public Land Mobile Network (PLMN)".
- [63] 3GPP TS 25.411: "UTRAN Iu interface Layer 1".

- [64] 3GPP TS 25.414: "UTRAN Iu interface data transport & transport signalling".
- [65] 3GPP TS 23.271: "Functional stage 2 description of LCS".
- [66] 3GPP TS 23.015: "Technical realization of Operator Determined Barring (ODB)".
- [67] ITU-T Recommendation I.363.5: "B-ISDN ATM Adaptation Layer (AAL) specification: Type 5 AAL".
- [68] RFC 2373 (1998): "IP Version 6 Addressing Architecture".
- [69] RFC 2462 (1998): "IPv6 Stateless Address Autoconfiguration".
- [70] 3GPP TS 32.215: "3G Telecom Management; Charging management; Charging data description for the Packet Switched (PS) domain".
- [71] RFC 2461 (1998): "Neighbor Discovery for IP Version 6 (IPv6)".
- [72] 3GPP TS 29.202: "Signalling System No. 7 (SS7) signalling transport in core network; Stage 3".
- [73] 3GPP TS 23.236: "Intra Domain Connection of RAN Nodes to Multiple CN Nodes".
- [74] 3GPP TS 43.051: "Radio Access Network; Overall description – Stage 2".
- [75] 3GPP TS 24.229: IP Multimedia Call Control Protocol based on SIP and SDP.
- [76] 3GPP TS 23.195: "Provision of UE Specific Behaviour Information to Network Entities".
- [77] 3GPP TS 44.060: General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol".
- [78] 3GPP TS 48.018: "General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)".
- [79] 3GPP TS 23.008: "Organization of subscriber data".
- [80] 3GPP TS 23.221: "Architectural requirements".
- [81] 3GPP TS 23.012: "Location Management Procedures".
- [82] 3GPP TS 22.101: "Service Principles".
- [83] 3GPP TS 23.251: " Network Sharing; Architecture and Functional Description".
- [84] 3GPP TS 32.422: "Subscriber and equipment trace; Trace control and Configuration Management (CM)".

*****THE NEXT CHANGE*****

5.7 Functionality Needed for Mobile IP Using IPv4

To support the optional Mobile IP services, see 3GPP TS 23.121 [54], efficiently by GPRS, Foreign Agent (FA) functionality needs to be provided in the GGSN. The interface between the GGSN and FA, including the mapping between the care of IP address and the GTP tunnel in the PLMN is not standardized as the GGSN and FA are considered to be one integrated node.

Mobile IP services need a Home Agent (HA). The HA is a router that tunnels datagrams to an FA. The FA de-tunnels the datagrams and sends them towards the MS that is in a PLMN. The HA maintains current location information for each of the departed users. The location of the HA is outside the scope of the 3GPP specifications.

The FA and HA functionality is specified in RFC [20023344](#) [46].

*****THE NEXT CHANGE*****

9.2.1 Static and Dynamic PDP Addresses

PDP addresses can be allocated to an MS in four different ways:

- the HPLMN operator assigns a PDP address permanently to the MS (static PDP address);
- the HPLMN operator assigns a PDP address to the MS when a PDP context is activated (dynamic HPLMN PDP address);
- the VPLMN operator assigns a PDP address to the MS when a PDP context is activated (dynamic VPLMN PDP address); or
- the PDN operator or administrator assigns a permanent or dynamic IP address to the MS (External PDN Address Allocation).

It is the HPLMN operator that defines in the subscription whether a dynamic HPLMN or VPLMN PDP address can be used.

For every IMSI, zero, one, or more dynamic PDP addresses per PDP type can be assigned. For every IMSI, zero, one, or more static PDP addresses per PDP type can be subscribed to.

When dynamic addressing from the HPLMN or the VPLMN is used, it is the responsibility of the GGSN to allocate and release the dynamic PDP address. When External PDN Address Allocation is used, the PLMN may obtain a PDP address from the PDN and provide it to the MS during PDP context activation, or the MS may directly negotiate a PDP address with the PDN after the PDP context activation procedure is executed. If the PLMN provides the address during PDP context activation in case of External PDN Address Allocation, then it is the responsibility of the GGSN and PDN to allocate and release the dynamic PDP address by means of protocols such as DHCP or RADIUS. If DHCP is used, the GGSN provides the function of a DHCP Client. If RADIUS is used, the GGSN provides the function of a RADIUS Client. If the MS negotiates a PDP address with the PDN after PDP context activation in case of External PDN Address Allocation, it is the responsibility of the MS and the PDN to allocate and release the PDP address by means of protocols such as DHCP or MIP. In case of DHCP, the GGSN provides the function of a DHCP Relay Agent as defined in RFC 2131 [47] and RFC 1542 [45]. In case of MIP, the GGSN provides the function of a Foreign Agent as defined in RFC ~~3344~~2002 [46].

Only static PDP addressing is applicable in the network-requested PDP context activation case.

CR-Form-v7.1

CHANGE REQUEST

☞ **23.060 CR 522** ☞ rev **2** ☞ Current version: **6.7.0** ☞

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:	☞ Redirection for network sharing		
Source:	☞ 3GPP TSG_SA WG2		
Work item code:	☞ NTShar	Date:	☞ 30/01/2005
Category:	☞ F	Release:	☞ Rel-6
	Use <u>one</u> 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 <u>one</u> of the following releases: Ph2 (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) Rel-7 (Release 7)

Reason for change:	☞ At certain points in the signalling, redirection as described in TS23.251 may be initiated. This needs to be indicated in TS23.060 with appropriate references to TS23.251.
Summary of change:	☞ Text is added in the descriptions of signalling where redirection may be indicated by a core network node.
Consequences if not approved:	☞ Unclear description of core network node behaviour in relation to redirection.

Clauses affected:	☞ 3.2, 6.5.3, 6.9.2, 6.13.1.2, 6.13.2.2						
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> Other core specifications ☞	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Y	N						
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> Test specifications ☞	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Y	N						
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> O&M Specifications ☞	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Y	N						
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
Other comments:	☞						

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***** BEGINNING OF 1st CHANGE

3.2 Abbreviations

Applicable abbreviations can be found in GSM 01.04 [1] and 3GPP 21.905 [9]. For the purposes of the present document the following abbreviations apply:

AAL5	ATM Adaptation Layer type 5
ADD	Automatic Device Detection
APN	Access Point Name
ATM	Asynchronous Transfer Mode
AUTN	Authentication Token
BG	Border Gateway
BSSAP+	Base Station System Application Part +
BSSGP	Base Station System GPRS Protocol
BVCI	BSSGP Virtual Connection Identifier
CCU	Channel Codec Unit
CDR	Call Detail Record
CGF	Charging Gateway Functionality
CGI	Cell Global Identification
CK	Cipher Key
CMM	Circuit Mobility Management
CS	Circuit Switched
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
DTM	Dual Transfer Mode
EGPRS	Enhanced GPRS Encapsulating Security Payload
GEA	GPRS Encryption Algorithm
GERAN	GSM EDGE Radio Access Network
GGSN	Gateway GPRS Support Node
GMM/SM	GPRS Mobility Management and Session Management
GPRS-SSF	GPRS Service Switching Function
GPRS-CSI	GPRS CAMEL Subscription Information
GRA	GERAN Registration Area
GSM-SCF	GSM Service Control Function
GSIM	GSM Service Identity Module
GSN	GPRS Support Node
GTP	GPRS Tunnelling Protocol
GTP-C	GTP Control Plane
GTP-U	GTP User Plane
ICMP	Internet Control Message Protocol
IETF	Internet Engineering Task Force
IK	Integrity Key
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
IPX	Internet Packet eXchange
ISP	Internet Service Provider
KSI	Key Set Identifier
L2TP	Layer-2 Tunnelling Protocol
LL-PDU	LLC PDU
LLC	Logical Link Control
MAC	Medium Access Control
MIP	Mobile IP
<u>MOCN</u>	<u>Multi-Operator Core Network</u>
MNRF	Mobile station Not Reachable Flag
MNRG	Mobile station Not Reachable for GPRS flag
MNRR	Mobile station Not Reachable Reason
MTP2	Message Transfer Part layer 2
MTP3	Message Transfer Part layer 3
NACC	Network Assisted Cell Change

NGAF	Non-GPRS Alert Flag
N-PDU	Network Protocol Data Unit
NS	Network Service
NSAPI	Network layer Service Access Point Identifier
NSS	Network SubSystem
ODB	Operator Determined Barring
P-TMSI	Packet TMSI
PCU	Packet Control Unit
PDCH	Packet Data CHannel
PDCP	Packet Data Convergence Protocol
PDN	Packet Data Network
PDP	Packet Data Protocol, e.g. IP
PDU	Protocol Data Unit
PMM	Packet Mobility Management
PPF	Paging Proceed Flag
PPP	Point-to-Point Protocol
PTP	Point To Point
PVC	Permanent Virtual Circuit
RA	Routeing Area
RAB	Radio Access Bearer
RAC	Routeing Area Code
RAI	Routeing Area Identity
RANAP	Radio Access Network Application Protocol
RAU	Routeing Area Update
RLC	Radio Link Control
RNC	Radio Network Controller
RNS	Radio Network Subsystem
RNTI	Radio Network Temporary Identity
RRC	Radio Resource Control
SBSC	Serving Base Station Controller
SBSS	Serving BSS
SGSN	Serving GPRS Support Node
SM	Short Message
SM-SC	Short Message service Service Centre
SMS-GMSC	Short Message Service Gateway MSC
SMS-IW MSC	Short Message Service Interworking MSC
SN-PDU	SNDCP PDU
SNDC	SubNetwork Dependent Convergence
SNDCP	SubNetwork Dependent Convergence Protocol
SPI	Security Parameter Index
SRNC	Serving RNC
SRNS	Serving RNS
TCAP	Transaction Capabilities Application Part
TCP	Transmission Control Protocol
TFT	Traffic Flow Template
TEID	Tunnel Endpoint IDentifier
TLLI	Temporary Logical Link Identity
TOM	Tunnelling Of Messages
TOS	Type of Service
TRAU	Transcoder and Rate Adaptor Unit
UDP	User Datagram Protocol
UEA	UMTS Encryption Algorithm
UESBI-Iu	UE Specific Behaviour Information - Iu
UESBI-Uu	UE Specific Behaviour Information - Uu
UIA	UMTS Integrity Algorithm
URA	UTRAN Registration Area
USIM	User Service Identity Module
UTRAN	UMTS Terrestrial Radio Access Network

3.3 Symbols

For the purposes of the present document, the following symbols apply:

Ga Charging data collection interface between a CDR transmitting unit (e.g. an SGSN or a GGSN) and a CDR receiving functionality (a CGF).

***** END OF 1st CHANGE

***** BEGINNING OF 2nd CHANGE

6.5.3 Combined GPRS / IMSI Attach procedure

The Combined GPRS / IMSI Attach procedure is illustrated in Figure 22.

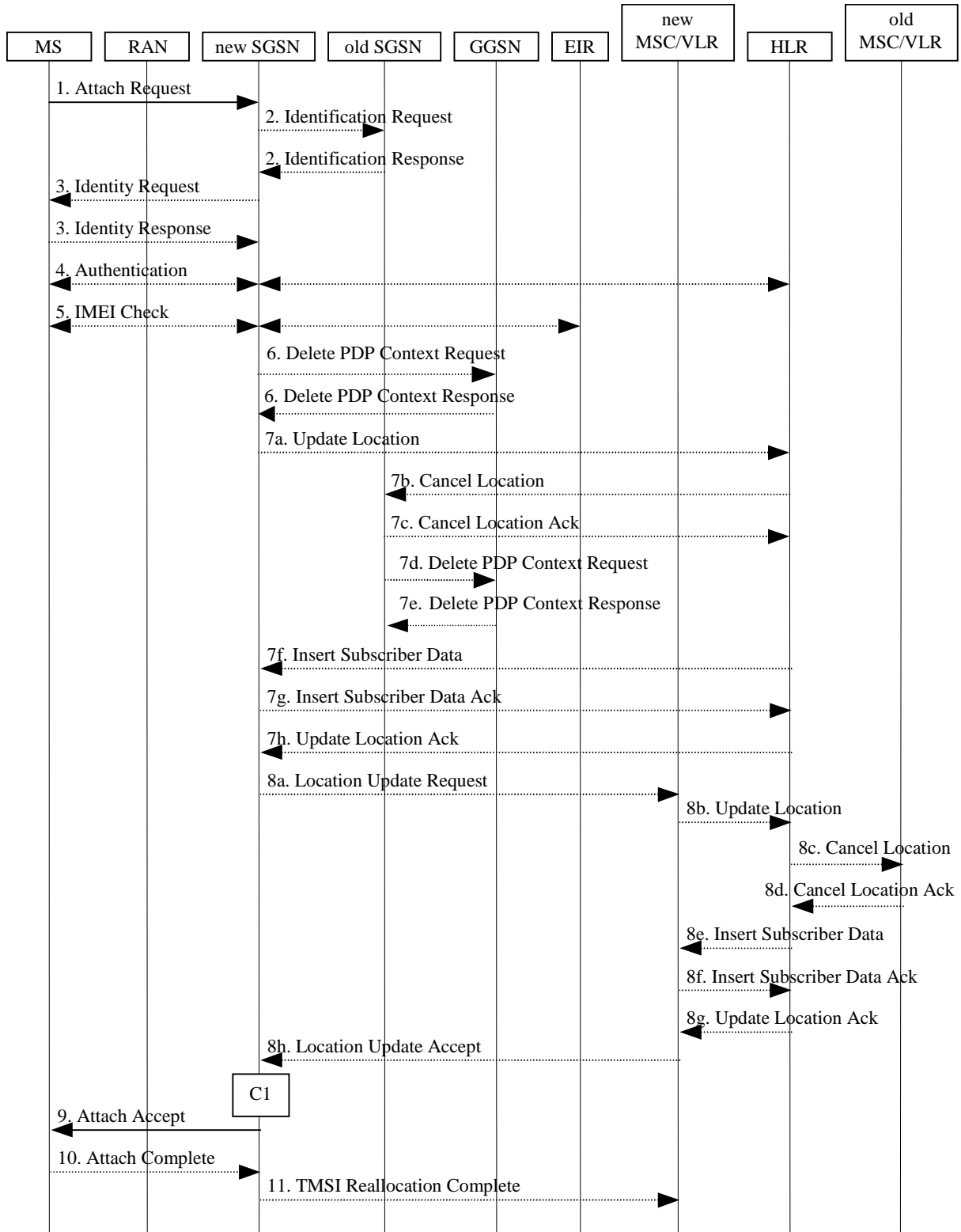


Figure 22: Combined GPRS / IMSI Attach Procedure

- 1) In A/Gb mode, the MS initiates the attach procedure by the transmission of an Attach Request (IMSI or P-TMSI and old RAI, Classmark, CKSN, Attach Type, DRX Parameters, old P-TMSI Signature) message to the SGSN. IMSI shall be included if the MS does not have a valid P-TMSI available. If the MS has a valid P-TMSI, then P-TMSI and the old RAI associated with P-TMSI shall be included. Classmark contains the MS's GPRS multislot capabilities and supported GPRS ciphering algorithms in addition to the existing classmark parameters defined in GSM 04.08. Attach Type indicates which type of attach is to be performed, i.e. GPRS attach only, GPRS Attach while already IMSI attached, or combined GPRS / IMSI attach. DRX Parameters indicates whether the MS uses discontinuous reception or not. If the MS uses discontinuous reception, then DRX Parameters also indicate when the MS is in a non-sleep mode able to receive paging requests and channel assignments. If the MS uses P-TMSI for identifying itself and if it has also stored its old P-TMSI Signature, then the MS shall include the old P-TMSI Signature in the Attach Request message.

For Iu mode, the MS initiates the attach procedure by the transmission of an Attach Request (IMSI or P-TMSI and old RAI, Core Network Classmark, KSI, Attach Type, old P-TMSI Signature, Follow On Request, DRX Parameters) message to the SGSN. IMSI shall be included if the MS does not have a valid P-TMSI available. If the MS uses P-TMSI for identifying itself and if it has also stored its old P-TMSI Signature, then the MS shall include the old P-TMSI Signature in the Attach Request message. If the MS has a valid P-TMSI, then P-TMSI and the old RAI associated with P-TMSI shall be included. KSI shall be included if the MS has valid security parameters. Core Network Classmark is described in clause "MS Network Capability". The MS shall set "Follow On Request" if there is pending uplink traffic (signalling or user data). The SGSN may use, as an implementation option, the follow on request indication to release or keep the Iu connection after the completion of the GPRS Attach procedure. Attach Type indicates which type of attach is to be performed, i.e. GPRS attach only, GPRS Attach while already IMSI attached, or combined GPRS / IMSI attach. DRX Parameters indicates whether or not the MS uses discontinuous reception and the DRX cycle length.

- 2) If the MS identifies itself with P-TMSI and the SGSN has changed since detach, the new SGSN sends an Identification Request (P-TMSI, old RAI, old P-TMSI Signature) to the old SGSN to request the IMSI. If the new SGSN provides functionality for Intra Domain Connection of RAN Nodes to Multiple CN Nodes, the new SGSN may derive the old SGSN from the old RAI and the old P-TMSI and send the Identification Request message to this old SGSN. Otherwise, the new SGSN derives the old SGSN from the old RAI. In any case the new SGSN will derive an SGSN that it believes is the old SGSN. This derived SGSN is itself the old SGSN, or it is associated with the same pool area as the actual old SGSN and it will determine the correct old SGSN from the P-TMSI and relay the message to that actual old SGSN. The old SGSN responds with Identification Response (IMSI, Authentication Triplets or Authentication Quintets). If the MS is not known in the old SGSN, the old SGSN responds with an appropriate error cause. The old SGSN also validates the old P-TMSI Signature and responds with an appropriate error cause if it does not match the value stored in the old SGSN.
- 3) If the MS is unknown in both the old and new SGSN, the SGSN sends an Identity Request (Identity Type = IMSI) to the MS. The MS responds with Identity Response (IMSI).
- 4) The authentication functions are defined in the clause "Security Function". If no MM context for the MS exists anywhere in the network, then authentication is mandatory. Ciphering procedures are described in clause "Security Function". If P-TMSI allocation is going to be done and the network supports ciphering, the network shall set the ciphering mode.
- 5) The equipment checking functions are defined in the clause "Identity Check Procedures". Equipment checking is optional.
- 6) If there are active PDP contexts in the new SGSN for this particular MS (i.e. the MS re-attaches to the same SGSN without having properly detached before), the new SGSN deletes these PDP contexts by sending Delete PDP Context Request (TEID) messages to the GGSNs involved. The GGSNs acknowledge with Delete PDP Context Response (TEID) messages.
- 7) If the SGSN number has changed since the GPRS detach, or if it is the very first attach, or if the Automatic Device Detection (ADD) function is supported and the IMEISV has changed (see [82] for ADD functional requirement), then the SGSN informs the HLR:
 - a) The SGSN sends an Update Location (SGSN Number, SGSN Address, IMSI, IMEISV) to the HLR. IMEISV is sent if the ADD function is supported.
 - b) The HLR sends Cancel Location (IMSI, Cancellation Type) to the old SGSN with Cancellation Type set to Update Procedure.

- c) The old SGSN acknowledges with Cancel Location Ack (IMSI). If there are any ongoing procedures for that MS, the old SGSN shall wait until these procedures are finished before removing the MM and PDP contexts.
 - d) If there are active PDP contexts in the old SGSN for this particular MS, the old SGSN deletes these PDP contexts by sending Delete PDP Context Request (TEID) messages to the GGSNs involved.
 - e) The GGSNs acknowledge with Delete PDP Context Response (TEID) messages.
 - f) The HLR sends Insert Subscriber Data (IMSI, GPRS Subscription Data) to the new SGSN.
 - g) The new SGSN validates the MS's presence in the (new) RA. If due to regional subscription restrictions or access restrictions (see TS 23.221 [80] and TS 23.008 [79]) the MS is not allowed to attach in the RA, the SGSN rejects the Attach Request with an appropriate cause, and may return an Insert Subscriber Data Ack (IMSI, SGSN Area Restricted) message to the HLR. If subscription checking fails for other reasons, the SGSN rejects the Attach Request with an appropriate cause and returns an Insert Subscriber Data Ack (IMSI, Cause) message to the HLR. [If the network supports the MOCN configuration for network sharing, the SGSN may, if the MS is not a 'Network Sharing Supporting MS', in this case decide to initiate redirection by sending a Reroute Command to the RNS, as described in TS23.251\[83\] instead of rejecting the Attach Request message.](#) If all checks are successful then the SGSN constructs an MM context for the MS and returns an Insert Subscriber Data Ack (IMSI) message to the HLR.
 - h) The HLR acknowledges the Update Location message by sending an Update Location Ack to the SGSN after the cancelling of old MM context and insertion of new MM context are finished. If the Update Location is rejected by the HLR, the SGSN rejects the Attach Request from the MS with an appropriate cause. [If the network supports the MOCN configuration for network sharing, the SGSN may, if the MS is not a 'Network Sharing Supporting MS', in this case decide to initiate redirection by sending a Reroute Command to the RNS, as described in TS23.251\[83\] instead of rejecting the Attach Request message.](#)
- 8) If Attach Type in step 1 indicated GPRS Attach while already IMSI attached, or combined GPRS / IMSI attached, then the VLR shall be updated if the Gs interface is installed. When the SGSN does not provide functionality for the Intra Domain Connection of RAN Nodes to Multiple CN Nodes, the VLR number is derived from the RAI. When the SGSN provides functionality for Intra Domain Connection of RAN Nodes to Multiple CN Nodes, the SGSN uses the RAI and a hash value from the IMSI to determine the VLR number. The SGSN starts the location update procedure towards the new MSC/VLR upon receipt of the first Insert Subscriber Data message from the HLR in step 6d). This operation marks the MS as GPRS-attached in the VLR.
- a) The SGSN sends a Location Update Request (new LAI, IMSI, SGSN Number, Location Update Type) message to the VLR. Location Update Type shall indicate IMSI attach if Attach Type indicated combined GPRS / IMSI attach. Otherwise, Location Update Type shall indicate normal location update. The VLR creates an association with the SGSN by storing SGSN Number. . In networks that support network sharing, the Location Update Request includes the identity of the selected core network operator if the SGSN has received this information from the RAN, as described in TS 23.251 [83].
 - b) If the LA update is inter-MSC, the new VLR sends Update Location (IMSI, new VLR) to the HLR.
 - c) If the LA update is inter-MSC, the HLR sends a Cancel Location (IMSI) to the old VLR.
 - d) The old VLR acknowledges with Cancel Location Ack (IMSI).
 - e) If the LA update is inter-MSC, the HLR sends Insert Subscriber Data (IMSI, subscriber data) to the new VLR.
 - f) The VLR acknowledges with Insert Subscriber Data Ack (IMSI).
 - g) After finishing the inter-MSC location update procedures, the HLR responds with Update Location Ack (IMSI) to the new VLR.
 - h) The VLR responds with Location Update Accept (VLR TMSI) to the SGSN.
- 9) The SGSN selects Radio Priority SMS, and sends an Attach Accept (P-TMSI, VLR TMSI, P-TMSI Signature, Radio Priority SMS) message to the MS. P-TMSI is included if the SGSN allocates a new P-TMSI.

10) If P-TMSI or VLR TMSI was changed, the MS acknowledges the received TMSI(s) by returning an Attach Complete message to the SGSN.

11) If VLR TMSI was changed, the SGSN confirms the VLR TMSI re-allocation by sending a TMSI Reallocation Complete message to the VLR.

If the Attach Request cannot be accepted, the SGSN returns an Attach Reject (IMSI, Cause) message to the MS. [If the network supports the MOCN configuration for network sharing, the SGSN may, if the MS is not a 'Network Sharing Supporting MS', in this case decide to initiate redirection by sending a Reroute Command to the RNS, as described in TS23.251\[83\] instead of returning an Attach Reject \(IMSI, Cause\) message to the MS.](#)

The CAMEL procedure call shall be performed, see referenced procedure in 3GPP TS 23.078:

C1) CAMEL_GPRS_Attach and CAMEL_PS_Notification.

They are called in the following order:

- The procedure CAMEL_GPRS_Attach is called. In Figure 22, the procedure returns as result "Continue".
- Then the procedure CAMEL_PS_Notification is called. The procedure returns as result "Continue".

6.6 Detach Function

The GPRS Detach procedure allows:

***** END OF 2nd CHANGE

***** BEGINNING OF 3rd CHANGE

6.9.2 Location Management Procedures (Iu-mode)

In the context of this specification, the terms RNS or RNC refer also to a GERAN BSS or BSC (respectively) when serving an MS in Iu mode.

Refer to 3GPP TS 25.301 for further information on the location management procedures for the UTRAN.

The PLMN shall provide information for the MS to be able to:

- detect when it has entered a new cell or a new RA; and
- determine when to perform periodic RA updates.

In this specification, only the Location Management procedures related to the CN are described. These procedures are:

- a routing area update procedure; and
- Serving RNC relocation procedure.

An MS detects entering a new cell by comparing the cell's identity with the cell identity stored in the MS. By comparing the RAI stored in the MS's MM context with the RAI received from the network, the MS detects that an RA update shall be performed. In RRC-CONNECTED mode (PMM-CONNECTED state or CS MM CONNECTED state), the MS is informed of RAI and Cell Identity by the serving RNC via an "MM information" message at the RRC layer. In RRC-IDLE state, the MS is informed of RAI and Cell Identity by the broadcast system information at the RRC layer.

If the MS enters a new PLMN, the MS shall perform a routing area update, unless it is not allowed to do so for the reasons specified in TS 24.008 [13] and TS 23.122 [7b].

In network mode of operation II, whenever an MS determines that it shall perform both an LA update and an RA update, the MS shall start the LA update first. The MS should start the RA update procedure before the LA update is completed.

6.9.2.1 Routing Area Update Procedure

A routing area update takes place when an attached MS detects that it has entered a new RA or when the periodic RA update timer has expired or when RRC connection is released with cause "Directed Signalling connection re-establishment" or when the MS has to indicate new access capabilities to the network.

The SGSN detects that it is an intra-SGSN routing area update by noticing that it also handles the old RA. In this case, the SGSN has the necessary information about the MS and there is no need to inform the GGSNs or the HLR about the new MS location. A periodic RA update is always an intra-SGSN routing area update. If the network operates in mode I, an MS that is in CS/PS mode of operation shall perform the Combined RA / LA Update procedures except this CS/PS mode MS is engaged in a CS connection, then it shall perform (non combined) RA Update procedures.

In Iu mode, an RA update is either an intra-SGSN or inter-SGSN RA update, either combined RA / LA update or only RA update, either initiated by an MS in PMM-CONNECTED or in PMM-IDLE state. The SRNC may provide a PMM-CONNECTED state MS with MM information like RAI by dedicated signalling. Typically, the SRNC should not provide a RAI to an MS in PMM-CONNECTED state. An exception is after an SRNS relocation, in which case the new SRNC shall indicate the RAI to the MS.

All the RA update cases are contained in the procedure illustrated in Figure 36.

NOTE 1: The network may receive an RA update from a UE in PMM-CONNECTED state over a new Iu signalling connection. This could happen when the UE enters PMM-IDLE state on receipt of RRC Connection Release with cause "Directed Signalling connection re-establishment" and initiates an RA or Combined RA update procedure (see clause 6.1.2.4.1).

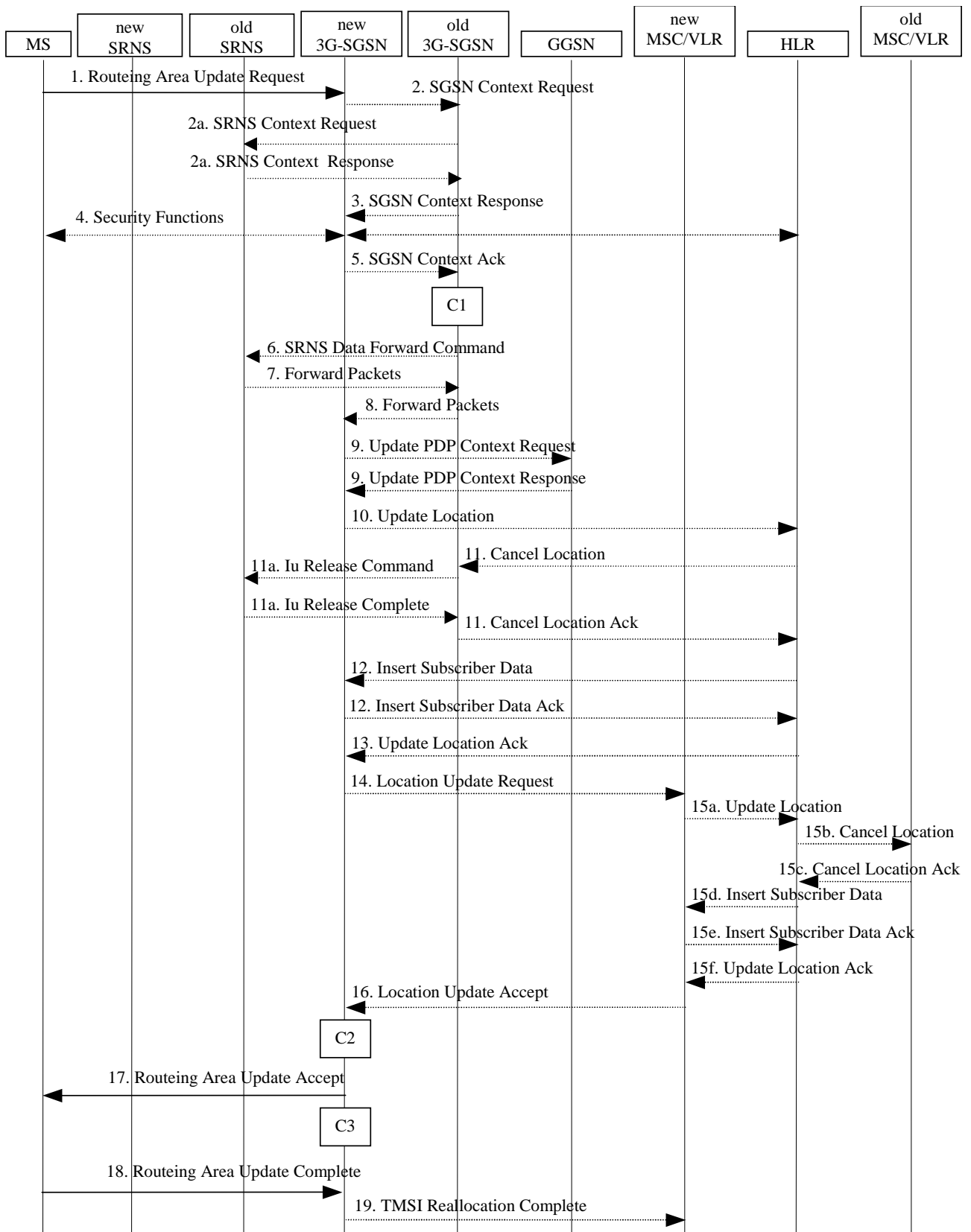


Figure 36: Iu mode RA Update Procedure

- 1) The RRC connection is established, if not already done. The MS sends a Routeing Area Update Request message (P-TMSI, old RAI, old P-TMSI Signature, Update Type, follow on request, Classmark, DRX Parameters, MS Network Capability) to the new SGSN. The MS shall set a follow-on request if there is pending uplink traffic (signalling or user data). The SGSN may use, as an implementation option, the follow-on request indication to release or keep the Iu connection after the completion of the RA update procedure. Update Type shall indicate:
- RA Update if the RA Update is triggered by a change of RA;
 - Periodic RA Update if the RA update is triggered by the expiry of the Periodic RA Update timer;
 - Combined RA / LA Update if the MS is also IMSI-attached and the LA update shall be performed in network operation mode I (see clause "Interactions Between SGSN and MSC/VLR"); or
 - Combined RA / LA Update with IMSI attach requested if the MS wants to perform an IMSI attach in network operation mode I.

The SRNC shall add the Routeing Area Identity including the RAC and LAC of the area where the MS is located before forwarding the message to the 3G-SGSN. This RA identity corresponds to the RAI in the MM system information sent by the SRNC to the MS. Classmark is described in clause "MS Network Capability". DRX Parameters indicates whether or not the MS uses discontinuous reception and the DRX cycle length.

NOTE 2: Sending the Routeing Area Update Request message to the SGSN triggers the establishment of a signalling connection between RAN and SGSN for the concerned MS.

- 2) If the RA update is an Inter-SGSN Routeing area update and if the MS was in PMM-IDLE state, the new SGSN sends an SGSN Context Request message (old P-TMSI, old RAI, old P-TMSI Signature) to the old SGSN to get the MM and PDP contexts for the MS. If the new SGSN provides functionality for Intra Domain Connection of RAN Nodes to Multiple CN Nodes, the new SGSN may derive the old SGSN from the old RAI and the old P-TMSI and send the SGSN Context Request message to this old SGSN. Otherwise, the new SGSN derives the old SGSN from the old RAI. In any case the new SGSN will derive an SGSN that it believes is the old SGSN. This derived SGSN is itself the old SGSN, or it is associated with the same pool area as the actual old SGSN and it will determine the correct old SGSN from the P-TMSI and relay the message to that actual old SGSN. The old SGSN validates the old P-TMSI Signature and responds with an appropriate error cause if it does not match the value stored in the old SGSN. This should initiate the security functions in the new SGSN. If the security functions authenticate the MS correctly, the new SGSN shall send an SGSN Context Request (IMSI, old RAI, MS Validated) message to the old SGSN. MS Validated indicates that the new SGSN has authenticated the MS. If the old P-TMSI Signature was valid or if the new SGSN indicates that it has authenticated the MS, the old SGSN starts a timer.. If the MS is not known in the old SGSN, the old SGSN responds with an appropriate error cause.
- 2a) If the MS is PMM-CONNECTED state in the old 3G-SGSN or, in case of an intra-SGSN RA update, if the MS is in the PMM-CONNECTED state and the RAU was received over another Iu connection than the established one, the old SGSN sends an SRNS Context Request (IMSI) message to the old SRNS to retrieve the sequence numbers for the PDP context for inclusion in the SGSN Context Response message. Upon reception of this message, the SRNS buffers and stops sending downlink PDUs to the MS and returns an SRNS Context Response (IMSI, GTP-SNDs, GTP-SNUs, PDCP-SNUs) message. The SRNS shall include for each PDP context the next in-sequence GTP sequence number to be sent to the MS and the GTP sequence number of the next uplink PDU to be tunnelled to the GGSN. For each active PDP context which uses lossless PDCP, the SRNS also includes the uplink PDCP sequence number (PDCP-SNU). PDCP-SNU shall be the next in-sequence PDCP sequence number expected from the MS (per each active radio bearer). No conversion of PDCP sequence numbers to SNDPCP sequence numbers shall be done in the 3G-SGSN.
- 3) The old 3G-SGSN responds with an SGSN Context Response (MM Context, PDP Contexts) message. For each PDP context the old 3G-SGSN shall include the GTP sequence number for the next uplink GTP PDU to be tunnelled to the GGSN and the next downlink GTP sequence number for the next PDU to be sent to the MS. Each PDP Context also includes the PDCP sequence numbers if PDCP sequence numbers are received from the old SRNS. The new 3G-SGSN shall ignore the MS Network Capability contained in MM Context of SGSN Context Response only when it has previously received an MS Network Capability in the Routeing Area Request. The GTP sequence numbers received from the old 3G-SGSN are only relevant if delivery order is required for the PDP context (QoS profile).
- 4) Security functions may be executed. These procedures are defined in clause "Security Function". If the SGSN Context Response message did not include IMEISV and ADD is supported, the SGSN retrieves the IMEISV from the MS. If the security functions do not authenticate the MS correctly, the routeing area update shall be

rejected, and the new SGSN shall send a reject indication to the old SGSN. The old SGSN shall continue as if the SGSN Context Request was never received.

- 5) If the RA update is an Inter-SGSN Routeing area update, the new SGSN sends an SGSN Context Acknowledge message to the old SGSN. The old SGSN marks in its context that the MSC/VLR association and the information in the GGSNs and the HLR are invalid. This triggers the MSC/VLR, the GGSNs, and the HLR to be updated if the MS initiates a routeing area update procedure back to the old SGSN before completing the ongoing routeing area update procedure.
- 6) If the MS is in PMM-CONNECTED state in the old 3G-SGSN or, in case of an intra-SGSN RA update, if the MS is PMM connected and the RAU was received over another Iu connection than the established one, the old 3G-SGSN sends an SRNS Data Forward Command (RAB ID, Transport Layer Address, Iu Transport Association) message to the SRNS. Upon receipt of the SRNS Data Forward Command message from the 3G-SGSN, the SRNS shall start the data-forwarding timer.
- 7) For each indicated RAB the SRNS starts duplicating and tunnelling the buffered GTP PDUs to the old 3G-SGSN. For each radio bearer which uses lossless PDCP the SRNS shall start tunnelling the partly transmitted and the transmitted but not acknowledged PDCP-PDUs together with their related PDCP sequence numbers and start duplicating and tunnelling the buffered GTP PDUs to the old 3G-SGSN. Upon receipt of the SRNS Data Forward Command message from the 3G-SGSN, the SRNS shall start the data-forwarding timer.
- 8) If the RA update is an Inter-SGSN RA Update, the old 3G-SGSN tunnels the GTP PDUs to the new 3G-SGSN. No conversion of PDCP sequence numbers to SNDCP sequence numbers shall be done in the 3G-SGSN.
- 9) If the RA update is an Inter-SGSN RA Update and if the MS was not in PMM-CONNECTED state in the new 3G-SGSN, the new SGSN sends Update PDP Context Request (new SGSN Address, QoS Negotiated, Tunnel Endpoint Identifier, serving network identity, CGI/SAI, RAT type) to the GGSNs concerned. The SGSN shall send the serving network identity to the GGSN. The GGSNs update their PDP context fields and return an Update PDP Context Response (Tunnel Endpoint Identifier, Prohibit Payload Compression, APN Restriction). The Prohibit Payload Compression indicates that the SGSN should negotiate no data compression for this PDP context. Note: If the RA update is an Inter-SGSN routeing area update initiated by an MS in PMM-CONNECTED state in the new 3G-SGSN, the Update PDP Context Request message is sent as described in subclause "Serving RNS Relocation Procedures".
- 10) If the RA update is an Inter-SGSN RA Update, the new SGSN informs the HLR of the change of SGSN by sending Update Location (SGSN Number, SGSN Address, IMSI, IMEISV) to the HLR. IMEISV is sent if the ADD function is supported.
- 11) If the RA update is an Inter-SGSN RA Update, the HLR sends Cancel Location (IMSI, Cancellation Type) to the old SGSN with Cancellation Type set to Update Procedure. If the timer described in step 2 is not running, the old SGSN removes the MM context. Otherwise, the contexts are removed only when the timer expires. It also ensures that the MM context is kept in the old SGSN in case the MS initiates another inter SGSN routeing area update before completing the ongoing routeing area update to the new SGSN. The old SGSN acknowledges with Cancel Location Ack (IMSI).
- 11a) On receipt of Cancel Location, if the MS is PMM-CONNECTED in the old 3G-SGSN, the old 3G-SGSN sends an Iu Release Command message to the old SRNC. When the data-forwarding timer has expired, the SRNS responds with an Iu Release Complete message.
- 12) If the RA update is an inter-SGSN RA Update, the HLR sends Insert Subscriber Data (IMSI, subscription data) to the new SGSN. The new SGSN validates the MS's presence in the (new) RA. If due to regional subscription restrictions or access restrictions the MS is not allowed to be attached in the RA, the SGSN rejects the Routeing Area Update Request with an appropriate cause, and may return an Insert Subscriber Data Ack (IMSI, SGSN Area Restricted) message to the HLR. [If the network supports the MOCN configuration for network sharing, the SGSN may, if the MS is not a 'Network Sharing Supporting MS', in this case decide to initiate redirection by sending a Reroute Command to the RNS, as described in TS23.251\[83\] instead of rejecting the Routeing Area Update Request.](#) If all checks are successful, the SGSN constructs an MM context for the MS and returns an Insert Subscriber Data Ack (IMSI) message to the HLR.
- 13) If the RA update is an Inter-SGSN RA Update, the HLR acknowledges the Update Location by sending Update Location Ack (IMSI) to the new SGSN.
- 14) If Update Type indicates combined RA / LA update with IMSI attach requested, or if the LA changed with the routeing area update, the association has to be established, and the new SGSN sends a Location Update Request

(new LAI, IMSI, SGSN Number, Location Update Type) to the VLR. Location Update Type shall indicate IMSI attach if Update Type in step 1 indicated combined RA / LA update with ISI attach requested. Otherwise, Location Update Type shall indicate normal location update. When the SGSN does not provide functionality for the Intra Domain Connection of RAN Nodes to Multiple CN Nodes, the VLR number is derived from the RAI. When the SGSN provides functionality for Intra Domain Connection of RAN Nodes to Multiple CN Nodes, the SGSN uses the RAI and a hash value from the IMSI to determine the VLR number. The SGSN starts the location update procedure towards the new MSC/VLR upon receipt of the first Insert Subscriber Data message from the HLR in step 8). The VLR creates or updates the association with the SGSN by storing SGSN Number. In networks that support network sharing, the Location Update Request includes the identity of the selected core network operator if the SGSN has received this information from the RNS, as described in TS 23.251 [83].

- 15) If the subscriber data in the VLR is marked as not confirmed by the HLR, the new VLR informs the HLR. The HLR cancels the old VLR and inserts subscriber data in the new VLR:
 - a) The new VLR sends an Update Location (new VLR) to the HLR.
 - b) The HLR cancels the data in the old VLR by sending Cancel Location (IMSI) to the old VLR.
 - c) The old VLR acknowledges with Cancel Location Ack (IMSI).
 - d) The HLR sends Insert Subscriber Data (IMSI, subscriber data) to the new VLR.
 - e) The new VLR acknowledges with Insert Subscriber Data Ack (IMSI).
 - f) The HLR responds with Update Location Ack (IMSI) to the new VLR.
- 16) The new VLR allocates a new TMSI and responds with Location Update Accept (VLR TMSI) to the SGSN. VLR TMSI is optional if the VLR has not changed.
- 17) The new SGSN validates the MS's presence in the new RA. If due to roaming restrictions or access restrictions the MS is not allowed to be attached in the RA, or if subscription checking fails, the SGSN rejects the routing area update with an appropriate cause. [If the network supports the MOCN configuration for network sharing, the SGSN may, if the MS is not a 'Network Sharing Supporting MS', in this case decide to initiate redirection by sending a Reroute Command to the RNS, as described in TS23.251\[83\] instead of rejecting the routing area update.](#) If all checks are successful, the new SGSN establishes MM context for the MS. The new SGSN responds to the MS with Routing Area Update Accept (P-TMSI, VLR TMSI, P-TMSI Signature).
- 18) The MS confirms the reallocation of the TMSIs by returning a Routing Area Update Complete message to the SGSN.
- 19) The new SGSN sends a TMSI Reallocation Complete message to the new VLR if the MS confirms the VLR TMSI.

NOTE 3: Steps 15, 16, and 19 are performed only if step 14 is performed.

NOTE: The new SGSN may initiate RAB establishment after execution of the security functions (step 4), or wait until completion of the RA update procedure. For the MS, RAB establishment may occur anytime after the RA update request is sent (step 1).

In the case of a rejected routing area update operation, due to regional subscription, roaming restrictions, or access restrictions (see TS 23.221 [80] and TS 23.008 [79]) the new SGSN shall not construct an MM context. A reject shall be returned to the MS with an appropriate cause. The MS shall not re-attempt a routing area update to that RA. The RAI value shall be deleted when the MS is powered up. [If the network supports the MOCN configuration for network sharing, the SGSN may, if the MS is not a 'Network Sharing Supporting MS', in this case decide to initiate redirection by sending a Reroute Command to the RNS, as described in TS23.251\[83\] instead of rejecting the routing area update.](#)

If the new SGSN is unable to update the PDP context in one or more GGSNs, the new SGSN shall deactivate the corresponding PDP contexts as described in subclause "SGSN-initiated PDP Context Deactivation Procedure". This shall not cause the SGSN to reject the routing area update.

The PDP Contexts shall be sent from old to new SGSN in a prioritized order, i.e. the most important PDP Context first in the SGSN Context Response message. (The prioritization method is implementation dependent, but should be based on the current activity.)

The new SGSN shall determine the Maximum APN restriction based on the received APN Restriction of each PDP context from the GGSN and then store the new Maximum APN restriction value.

If the new SGSN is unable to support the same number of active PDP contexts as received from old SGSN, the new SGSN should use the prioritisation sent by old SGSN as input when deciding which PDP contexts to maintain active and which ones to delete. In any case, the new SGSN shall first update all contexts in one or more GGSNs and then deactivate the context(s) that it cannot maintain as described in subclause "SGSN-initiated PDP Context Deactivation Procedure". This shall not cause the SGSN to reject the routing area update.

NOTE: In case MS was in PMM-CONNECTED state the PDP Contexts are sent already in the Forward Relocation Request message as described in subclause "Serving RNS relocation procedures".

If the routing area update procedure fails a maximum allowable number of times, or if the SGSN returns a Routing Area Update Reject (Cause) message, the MS shall enter PMM-DETACHED state.

If the Location Update Accept message indicates a reject, this should be indicated to the MS, and the MS shall not access non-PS services until a successful location update is performed.

The CAMEL procedure calls shall be performed, see referenced procedures in 3GPP TS 23.078:

C1) CAMEL_GPRS_PDP_Context_Disconnection, CAMEL_GPRS_Detach and CAMEL_PS_Notification.

They are called in the following order:

- The CAMEL_GPRS_PDP_Context_Disconnection procedure is called several times: once per PDP context. The procedure returns as result "Continue".
- Then the CAMEL_GPRS_Detach procedure is called once. The procedure returns as result "Continue".
- Then the CAMEL_PS_Notification procedure is called once. The procedure returns as result "Continue".

C2) CAMEL_GPRS_Routeing_Area_Update_Session and CAMEL_PS_Notification.

They are called in the following order:

- The CAMEL_GPRS_Routeing_Area_Update_Session procedure is called. The procedure returns as result "Continue".
- Then the CAMEL_PS_Notification procedure is called. The procedure returns as result "Continue".

C3) CAMEL_GPRS_Routeing_Area_Update_Context.

This procedure is called several times: once per PDP context. It returns as result "Continue".

6.9.2.2 Serving RNS Relocation Procedures

In the context of this specification, the terms RNS or RNC refer also to a GERAN BSS or BSC (respectively) when serving

***** END OF 3rd CHANGE

***** BEGINNING OF 4th CHANGE

6.13.1.2 A/Gb mode to Iu mode Intra-SGSN Change

The intersystem change from A/Gb mode to Iu mode takes place when a GPRS-attached MS changes from A/Gb mode to GERAN or UTRAN Iu mode. Depending on the GPRS mobility management state before the intersystem change and whether the RA is changed or not, one of the following procedures is initiated by the MS:

- When an MS in STANDBY state changes to Iu mode inside the current RA, the MS shall follow the selective RA update procedures, see clause "Selective RA Update".
- When an MS in STANDBY state changes to Iu mode and the RA changes, the MS shall initiate the Iu mode RA update procedure, see clause "Routeing Area Update Procedure".
- When an MS in READY state changes to Iu mode independent of whether the RA has changed or not, the MS shall initiate the Iu mode RA update procedure and afterwards initiate the RABs by the Service Request procedure, see clause "MS Initiated Service Request Procedure". The RA update procedure is either combined RA / LA update or only RA update.

If the network operates in mode I, an MS that is both PS-attached and CS-attached shall perform the Combined RA / LA Update procedure. This concerns only idle mode (see 3GPP TS 23.122), as no combined RA / LA updates are performed during a CS connection. In the context of this specification, the terms RNS or RNC refer also to a GERAN BSS or BSC (respectively) when serving an MS in Iu mode.

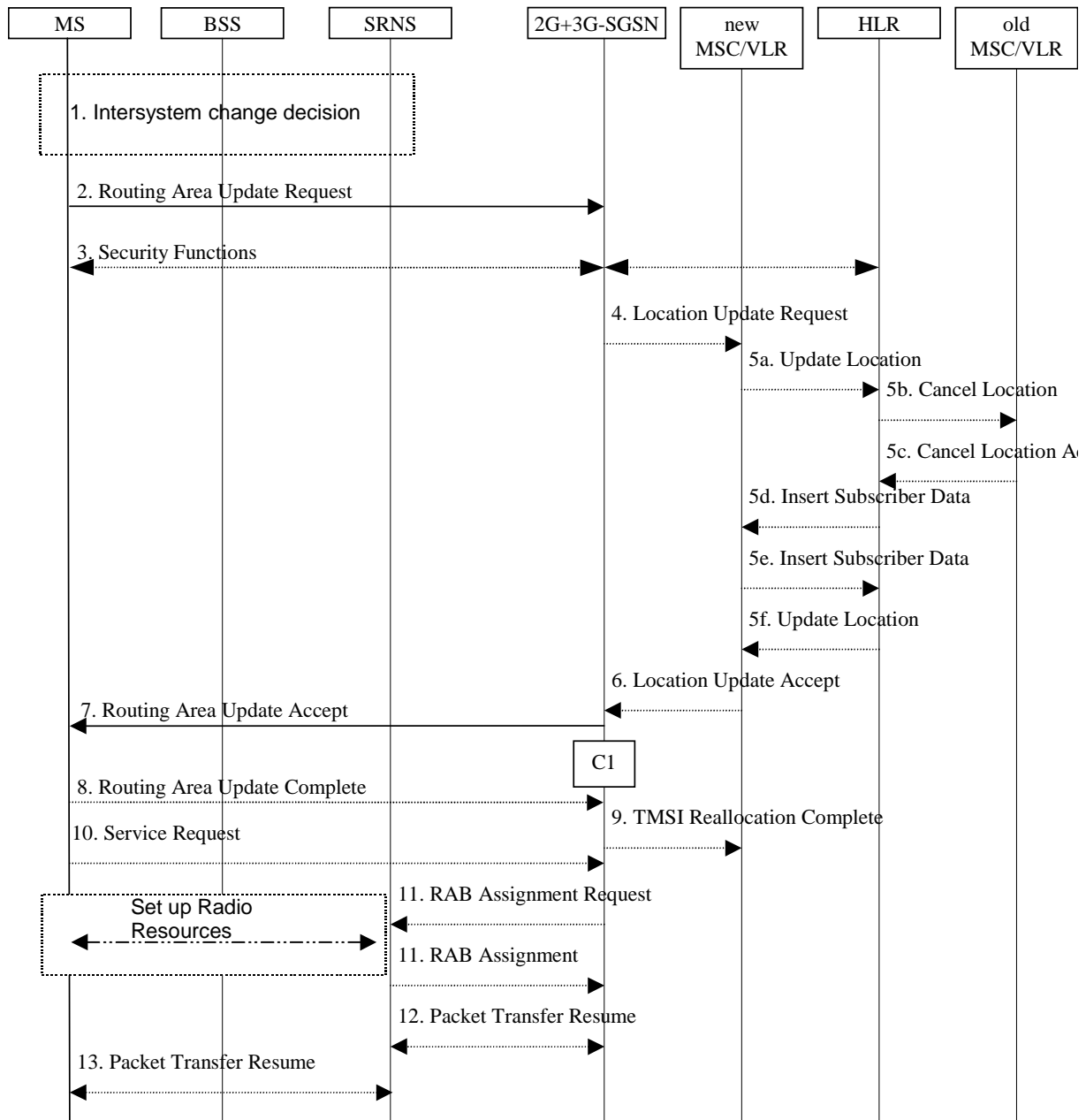


Figure 53: A/Gb mode to Iu mode Intra SGSN Change

- 1) The MS or the RAN decides to perform an intersystem change which makes the MS switch to a new cell where Iu mode has to be used, and stops transmission to the network.
- 2) The MS initiates an RRC connection establishment and sends a Routing Area Update Request (P-TMSI, Old RA, Old P-TMSI Signature, Update Type, CM) message to the combined 2G+3G-SGSN. Update Type shall indicate RA update or combined RA / LA update or, if the MS wants to perform an IMSI attach, combined RA / LA update with IMSI attach requested and also if the MS has a follow on request, i.e. if there is pending uplink traffic (signalling or data). The SGSN may use, as an implementation option, the follow-on request indication to release or keep the Iu connection after the completion of the RA update procedure. The SRNS shall add an identifier of the area where the message was received before passing the message to the 2G+3G-SGSN. The 2G+3G-SGSN stops transmission of N-PDUs to the MS.
- 3) Security functions may be executed.

- 4) If the association has to be established i.e. if Update Type indicates combined RA / LA update with IMSI attach requested, or if the LA changed with the routeing area update, the 2G+3G-SGSN sends a Location Update Request (new LAI, IMSI, SGSN Number, Location Update Type) to the VLR. Location Update Type shall indicate IMSI attach if Update Type in step 1 indicated combined RA / LA update with IMSI attach requested. Otherwise, Location Update Type shall indicate normal location update. When the SGSN does not provide functionality for the Intra Domain Connection of RAN Nodes to Multiple CN Nodes, the VLR number is derived from the RAI. When the SGSN provides functionality for Intra Domain Connection of RAN Nodes to Multiple CN Nodes, the SGSN uses the RAI and a hash value from the IMSI to determine the VLR number. The VLR creates or updates the association with the 2G+3G-SGSN by storing SGSN Number. In networks that support network sharing, the Location Update Request includes the identity of the selected core network operator if the SGSN has received this information from the RNS, as described in TS 23.251 [83].
- 5) If the subscriber data in the VLR is marked as not confirmed by the HLR, the new VLR informs the HLR. The HLR cancels the data in the old VLR and inserts subscriber data in the new VLR:
 - a) The new VLR sends an Update Location (new VLR) to the HLR.
 - b) The HLR cancels the data in the old VLR by sending Cancel Location (IMSI) to the old VLR.
 - c) The old VLR acknowledges with Cancel Location Ack (IMSI).
 - d) The HLR sends Insert Subscriber Data (IMSI, subscriber data) to the new VLR.
 - e) The new VLR acknowledges with Insert Subscriber Data Ack (IMSI).
 - f) The HLR responds with Update Location Ack (IMSI) to the new VLR.
- 6) The new VLR allocates a new VLR TMSI and responds with Location Update Accept (VLR TMSI) to the 2G+3G-SGSN. VLR TMSI is optional if the VLR has not changed.
- 7) The 2G+3G-SGSN validates the MS's presence in the new RA. If due to roaming restrictions or access restrictions the MS is not allowed to be attached in the RA, or if subscription checking fails, the 2G+3G-SGSN rejects the routeing area update with an appropriate cause. [If the network supports the MOCN configuration for network sharing, the SGSN may, if the MS is not a 'Network Sharing Supporting MS', in this case decide to initiate redirection by sending a Reroute Command to the RNS, as described in TS23.251\[83\] instead of rejecting the routeing area update.](#) If all checks are successful, the 2G+3G-SGSN updates MM and PDP contexts for the MS. A new P-TMSI may be allocated. A Routeing Area Update Accept (P-TMSI, P-TMSI Signature) message is returned to the MS. The 2G+3G-SGSN derives for this intersystem change the corresponding PDCP sequence numbers from the N-PDU sequence numbers stored in the SGSN PDP contexts by adding eight most significant bits "1". These PDCP sequence numbers are stored in the SGSN PDP contexts.
- 8) The MS acknowledges the new P-TMSI by returning a Routeing Area Update Complete message to the SGSN.
- 9) The 2G+3G-SGSN sends a TMSI Reallocation Complete message to the VLR if the MS confirms the VLR TMSI.
- 10) If the MS has pending uplink data or signalling, it shall send a Service Request (P-TMSI, RAI, CKSN, Service Type) message to the SGSN. Service Type specifies the requested service. Service Type shall indicate one of the following: Data or Signalling.
- 11) The 2G+3G-SGSN requests the SRNS to establish a radio access bearer by sending a RAB Assignment Request (RAB ID(s), QoS Profile(s), GTP-SNDs, GTP-SNUs, PDCP-SNUs) message to the SRNS. The PDCP sequence numbers are derived from the N-PDU sequence numbers and stored in the PDP contexts in step 7). The SRNS sends a Radio Bearer Setup Request (PDCP-SNUs) message to the MS. The MS responds with a Radio Bearer Setup Complete (PDCP-SNDs) message. The SRNS responds with a RAB Assignment Response message.

NOTE: The NSAPI value is carried in the RAB ID IE.

- 12) Traffic flow is resumed between the 2G+3G-SGSN and the SRNS. N-PDUs that were already sent to the MS in acknowledged mode SNDCP and that are not yet acknowledged by the MS are tunnelled by the 2G+3G-SGSN to the SRNS together with their related N-PDU number (SNDCP sequence number). No PDCP sequence numbers shall be indicated for these N-PDUs. The SRNS shall discard all N-PDUs with N-PDU sequence numbers older than the eight least significant bits of PDCP-SND received from the MS. Other N-PDUs shall be transmitted to the MS. The MS shall discard all N-PDUs with sequence numbers older than the eight least significant bits of the PDCP-SNU received from the SRNS. All other N-PDUs shall be transmitted to the SRNS.

The SRNS negotiates with the MS for each radio bearer the use of lossless PDCP or not regardless whether the old 2G-SGSN used acknowledged or unacknowledged SNDCP for the related NSAPI or not.

13) The traffic flow is resumed between the SRNS and the MS.

The CAMEL procedure calls shall be performed, see referenced procedure in 3GPP TS 23.078:

C1) CAMEL_GPRS_Routeing_Area_Update_Session, CAMEL_PS_Notification and CAMEL_GPRS_Routeing_Area_Update_Context.

- The procedure CAMEL_GPRS_Routeing_Area_Update_Session is called once relative to the session. In Figure 53, the procedure returns as result "Continue".
- Then the procedures CAMEL_PS_Notification is called once relative to the session. The procedure returns as result "Continue".
- Then the procedure CAMEL_GPRS_Routeing_Area_Update_Context is called once per PDP context. In Figure 53, the procedure returns as result "Continue".

6.13.1.3 Selective RA Update

The MS shall use the following procedures when in STANDBY or PMM-IDLE state.

***** END OF 4th CHANGE

***** BEGINNING OF 5th CHANGE

6.13.2.2 A/Gb mode to Iu mode Inter-SGSN Change

The inter-system change from A/Gb mode to Iu mode takes place when a GPRS-attached MS changes from A/Gb mode to UTRAN or GERAN Iu mode and the new RAN node serving the MS is served by a different SGSN. In this case the RA changes. Therefore, the MS shall initiate a Iu mode RA update procedure by establishing an RRC connection and initiating the RA update procedure. The RA update procedure is either combined RA / LA update or only RA update, these RA update cases are illustrated in Figure 55. In the context of this specification, the terms RNS or RNC refer also to a GERAN BSS or BSC (respectively) when serving an MS in Iu mode.

If the network operates in mode I, then an MS, that is both PS-attached and CS-attached, shall perform the Combined RA / LA Update procedures. This concerns only idle mode (see 3GPP TS 23.122), as no combined RA / LA updates are performed during a CS connection.

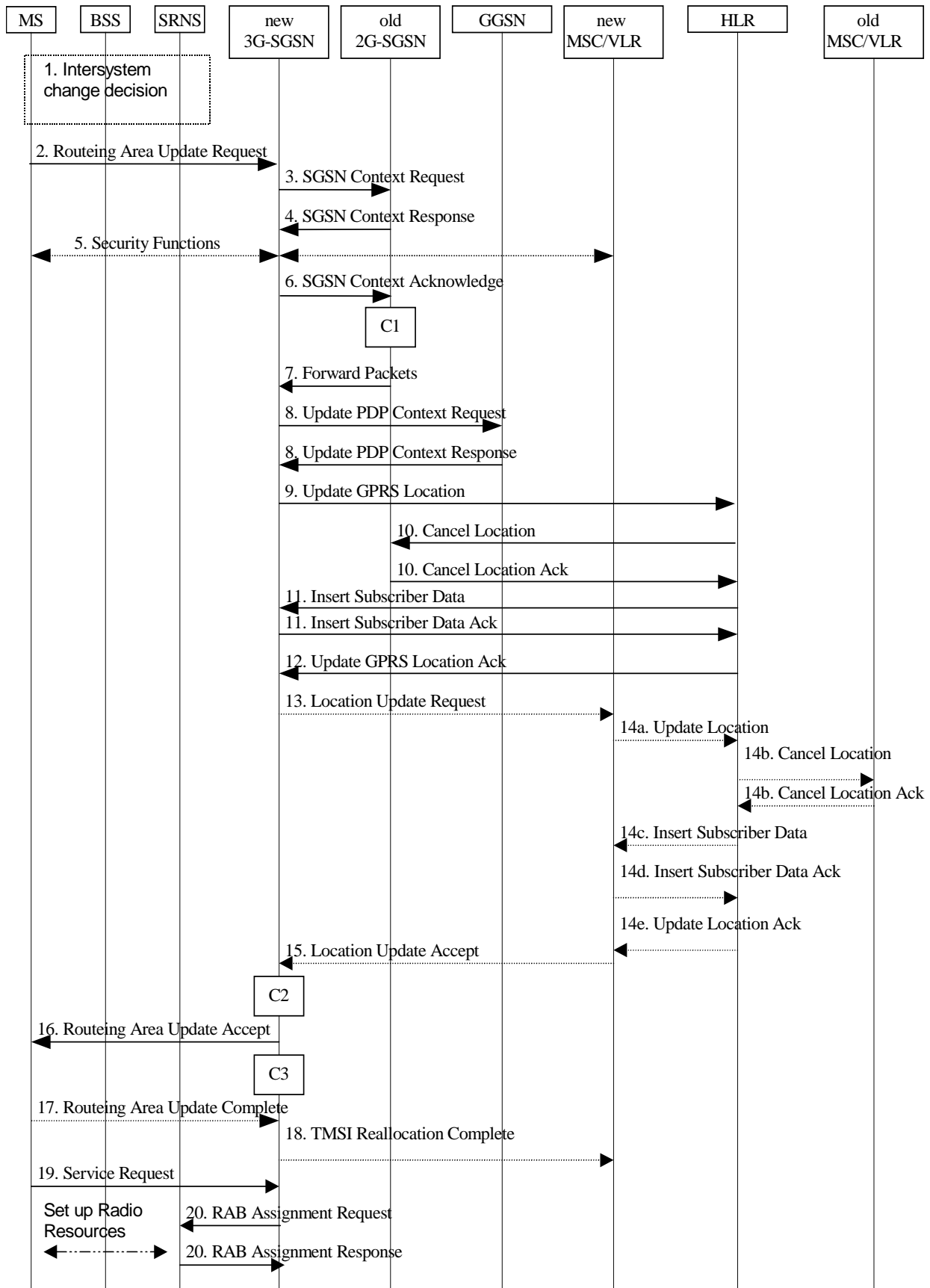


Figure 55: A/Gb mode to Iu mode Inter SGSN Change

- 1) The MS or RAN decides to perform an inter-system change, which makes the MS switch to a new cell where Iu mode has to be used, and stops transmission to the network.

- 2) The MS sends a Routing Area Update Request (P-TMSI, old RAI, old P-TMSI Signature, Update Type, CM, MS Network Capability) message to the new 3G-SGSN. Update Type shall indicate RA update or combined RA / LA update, or, if the MS wants to perform an IMSI attach, combined RA / LA update with IMSI attach requested, and also if the MS has a follow-on request, i.e. if there is pending uplink traffic (signalling or data). The SGSN may use, as an implementation option, the follow-on request indication to release or keep the Iu connection after the completion of the RA update procedure. The SRNC shall add the Routing Area Identity including the RAC and LAC of the area where the MS is located before forwarding the message to the 3G-SGSN. This RA identity corresponds to the RAI in the MM system information sent by the SRNC to the MS.
- 3) The new 3G-SGSN uses the old RAI received from the MS to derive the old 2G-SGSN address, and sends an SGSN Context Request (old RAI, old P-TMSI, New SGSN Address) message to the old 2G-SGSN to get the MM and PDP contexts for the MS. If the new SGSN provides functionality for Intra Domain Connection of RAN Nodes to Multiple CN Nodes, the new SGSN may derive the old SGSN from the old RAI and the old P-TMSI and send the SGSN Context Request message to this old SGSN. Otherwise, the new SGSN derives the old SGSN from the old RAI. In any case the new SGSN will derive an SGSN that it believes is the old SGSN. This derived SGSN is itself the old SGSN, or it is associated with the same pool area as the actual old SGSN and it will determine the correct old SGSN from the P-TMSI and relay the message to that actual old SGSN. The old 2G-SGSN validates the old P-TMSI Signature and responds with an appropriate error cause if it does not match the value stored in the old 2G-SGSN. If the received old P-TMSI Signature does not match the stored value, the old 2G-SGSN should initiate the security functions in the new 3G-SGSN. If the security functions authenticate the MS correctly, the new 3G-SGSN shall send an SGSN Context Request (old RAI, IMSI, MS Validated, New SGSN Address) message to the old 2G-SGSN. MS Validated indicates that the new 3G-SGSN has authenticated the MS. If the old P-TMSI Signature was valid or if the new 3G-SGSN indicates that it has authenticated the MS correctly, the old 2G-SGSN starts a timer and stops the transmission of N-PDUs to the MS.
- 4) The old 2G-SGSN responds with an SGSN Context Response (MM Context, PDP Contexts) message. Each PDP Context includes the GTP sequence number for the next downlink N-PDU to be sent to the MS and the GTP sequence number for the next uplink N-PDU to be tunnelled to the GGSN. Each PDP Context also includes the SMDCP Send N-PDU Number for the next downlink N-PDU to be sent in acknowledged mode SMDCP to the MS and the SMDCP Receive N-PDU Number for the next uplink N-PDU to be received in acknowledged mode SMDCP from the MS. The new 3G-SGSN derives the corresponding PDCP sequence numbers from these N-PDU sequence numbers by adding eight most significant bits "1". These PDCP sequence numbers are stored in the 3G-SGSN PDP contexts. The new 3G-SGSN shall ignore the MS Network Capability contained in MM Context of SGSN Context Response only when it has previously received an MS Network Capability in the Routing Area Request.
- 5) Security functions may be executed. If the SGSN Context Response message did not include IMEISV and the ADD function is supported by the new 3G-SGSN, then the IMEISV shall be retrieved from the MS.
- 6) The new 3G-SGSN sends an SGSN Context Acknowledge message to the old 2G-SGSN. This informs the old 2G-SGSN that the new 3G-SGSN is ready to receive data packets belonging to the activated PDP contexts. The old SGSN marks in its context that the MSC/VLR association and the information in the GGSNs and the HLR are invalid. This triggers the MSC/VLR, the GGSNs, and the HLR to be updated if the MS initiates a routing area update procedure back to the old SGSN before completing the ongoing routing area update procedure.
- 7) The old 2G-SGSN duplicates the buffered N-PDUs and starts tunnelling them to the new 3G-SGSN. Additional N-PDUs received from the GGSN before the timer described in step 3 expires are also duplicated and tunnelled to the new 3G-SGSN. N-PDUs that were already sent to the MS in acknowledged mode SMDCP and that are not yet acknowledged by the MS are tunnelled together with their related SMDCP N-PDU sequence number. No PDCP sequence numbers shall be indicated for these N-PDUs. No N-PDUs shall be forwarded to the new 3G-SGSN after expiry of the timer described in step 3.
- 8) The new 3G-SGSN sends an Update PDP Context Request (new SGSN Address, TEID, QoS Negotiated, serving network identity, CGI/SAI, RAT type) message to each GGSN concerned. The SGSN shall send the serving network identity to the GGSN. Each GGSN updates its PDP context fields and returns an Update PDP Context Response (TEID, Prohibit Payload Compression, APN Restriction) message. The Prohibit Payload Compression indicates that the SGSN should negotiate no data compression for this PDP context.
- 9) The new 3G-SGSN informs the HLR of the change of SGSN by sending an Update GPRS Location (SGSN Number, SGSN Address, IMSI, IMEISV) message to the HLR. IMEISV is sent if the ADD function is supported.

- 10) The HLR sends a Cancel Location (IMSI, Cancellation Type) message to the old 2G-SGSN. The old 2G-SGSN removes the MM and PDP contexts if the timer described in step 3 is not running. If the timer is running, the MM and PDP contexts are removed when the timer expires. The old 2G-SGSN acknowledges with a Cancel Location Ack (IMSI) message.
- 11) The HLR sends an Insert Subscriber Data (IMSI, GPRS Subscription Data) message to the new 3G-SGSN. The 3G-SGSN constructs an MM context for the MS and returns an Insert Subscriber Data Ack (IMSI) message to the HLR.
- 12) The HLR acknowledges the Update GPRS Location by returning an Update GPRS Location Ack (IMSI) message to the new 3G-SGSN.
- 13) If the association has to be established, if Update Type indicates combined RA / LA update with IMSI attach requested, or if the LA changed with the routing area update, the new SGSN sends a Location Update Request (new LAI, IMSI, SGSN Number, Location Update Type) to the VLR. Location Update Type shall indicate IMSI attach if Update Type in step 1 indicated combined RA / LA update with IMSI attach requested. Otherwise, Location Update Type shall indicate normal location update. When the SGSN does not provide functionality for the Intra Domain Connection of RAN Nodes to Multiple CN Nodes, the VLR number is derived from the RAI. When the SGSN provides functionality for Intra Domain Connection of RAN Nodes to Multiple CN Nodes, the SGSN uses the RAI and a hash value from the IMSI to determine the VLR number. The 3G-SGSN starts the location update procedure towards the new MSC/VLR upon receipt of the first Insert Subscriber Data message from the HLR in step 12). The VLR creates or updates the association with the 3G-SGSN by storing SGSN Number. In networks that support network sharing, the Location Update Request includes the identity of the selected core network operator if the new 3G-SGSN has received this information from the RNS, as described in TS 23.251 [83].
- 14) If the subscriber data in the VLR is marked as not confirmed by the HLR, the new VLR informs the HLR. The HLR cancels the old VLR and inserts subscriber data in the new VLR:
 - a) The new VLR sends an Update Location (new VLR) to the HLR.
 - b) The HLR cancels the data in the old VLR by sending Cancel Location (IMSI) to the old VLR.
 - c) The old VLR acknowledges with Cancel Location Ack (IMSI).
 - d) The HLR sends Insert Subscriber Data (IMSI, subscriber data) to the new VLR.
 - e) The new VLR acknowledges with Insert Subscriber Data Ack (IMSI).
 - f) The HLR responds with Update Location Ack (IMSI) to the new VLR.
- 15) The new VLR allocates a new TMSI and responds with Location Update Accept (VLR TMSI) to the 3G-SGSN. VLR TMSI is optional if the VLR has not changed.
- 16) The new 3G-SGSN validate the MS's presence in the new RA. If due to roaming restrictions or access restrictions the MS is not allowed to be attached in the RA, or if subscription checking fails, the new 3G-SGSN rejects the routing area update with an appropriate cause. [If the network supports the MOCN configuration for network sharing, the SGSN may, if the MS is not a 'Network Sharing Supporting MS', in this case decide to initiate redirection by sending a Reroute Command to the RNS, as described in TS23.251\[83\] instead of rejecting the routing area update.](#) If all checks are successful, the new 3G-SGSN constructs MM and PDP contexts for the MS. The new 3G-SGSN responds to the MS with a Routing Area Update Accept (P-TMSI, P-TMSI signature) message.
- 17) The MS acknowledges the new P-TMSI by returning a Routing Area Update Complete message to the SGSN.
- 18) The new 3G-SGSN sends TMSI Reallocation Complete message to the new VLR, if the MS confirms the VLR TMSI.
- 19) If the MS has uplink data or signalling pending it shall send a Service Request (P-TMSI, RAI, CKSN, Service Type) message to the SGSN. Service Type specifies the requested service. Service Type shall indicate one of the following: Data or Signalling.
- 20) If the MS has sent the Service Request, the new 3G-SGSN requests the SRNS to establish a radio access bearer by sending a RAB Assignment Request (RAB ID(s), QoS Profile(s), GTP-SNDs, GTP-SNU(s), PDCP-SNU(s)) message to the SRNS. The PDCP sequence numbers are derived from the N-PDU sequence numbers in step 4)

and stored in the SGSN PDP contexts. The SRNS sends a Radio Bearer Setup Request (PDCP-SNUs) message to the MS. The MS responds with a Radio Bearer Setup Complete (PDCP-SNDs) message. The MS deducts PDCP-SND from its Receive N-PDU Number by adding eight most significant bits "1". The SRNS responds with a RAB Assignment Response message. The SRNS shall discard all N-PDUs tunneled from the SGSN with N-PDU sequence numbers older than the eight least significant bits of the PDCP-SNDs received from the MS. Other N-PDUs shall be transmitted to the MS. The MS shall discard all N-PDUs with SNDCP sequence numbers older than the eight least significant bits of the PDCP-SNUs received from the SRNS. Other N-PDUs shall be transmitted to the SRNS. The SRNS negotiates with the MS for each radio bearer the use of lossless PDCP or not regardless whether the old 2G-SGSN used acknowledged or unacknowledged SNDCP for the related NSAPI or not.

NOTE: The NSAPI value is carried in the RAB ID IE.

NOTE: The new SGSN may initiate RAB establishment after execution of the security functions (step 5), or wait until completion of the RA update procedure. For the MS, RAB establishment may occur anytime after the RA update request is sent (step 2).

If the new SGSN is unable to update the PDP context in one or more GGSNs, the new SGSN shall deactivate the corresponding PDP contexts as described in subclause "SGSN-initiated PDP Context Deactivation Procedure". This shall not cause the SGSN to reject the routing area update.

The PDP Contexts shall be sent from old to new SGSN in a prioritized order, i.e. the most important PDP Context first in the SGSN Context Response message. (The prioritization method is implementation dependent, but should be based on the current activity.)

The new SGSN shall determine the Maximum APN restriction based on the received APN Restriction of each PDP context from the GGSN and then store the new Maximum APN restriction value.

If the new SGSN is unable to support the same number of active PDP contexts as received from old SGSN, the new SGSN should use the prioritisation sent by old SGSN as input when deciding which PDP contexts to maintain active and which ones to delete. In any case, the new SGSN shall first update all contexts in one or more GGSNs and then deactivate the context(s) that it cannot maintain as described in subclause "SGSN-initiated PDP Context Deactivation Procedure". This shall not cause the SGSN to reject the routing area update.

The CAMEL procedure calls shall be performed, see referenced procedures in 3GPP TS 23.078:

C1) CAMEL_GPRS_PDP_Context_Disconnection, CAMEL_GPRS_Detach and CAMEL_PS_Notification.

They are called in the following order:

- The CAMEL_GPRS_PDP_Context_Disconnection procedure is called several times: once per PDP context. The procedure returns as result "Continue".
- Then the CAMEL_GPRS_Detach procedure is called once. It returns as result "Continue".
- Then the CAMEL_PS_Notification procedure is called once. It returns as result "Continue".

C2) CAMEL_GPRS_Routing_Area_Update_Session and CAMEL_PS_Notification.

They are called in the following order:

- The CAMEL_GPRS_Routing_Area_Update_Session procedure is called. The procedure returns as result "Continue".
- Then the CAMEL_PS_Notification procedure is called. The procedure returns as result "Continue".

C3) CAMEL_GPRS_Routing_Area_Update_Context

This procedure is called several times: once per PDP context. It returns as result "Continue".

6.14 Classmark Handling

To support efficient radio interface usage in GPRS, the MS classmark is handled differently for SGSN-based services than for MSC-based services. In particular, the classmark information is sent in MM and Iu mode RRC messages to the

network and stored in the network as long as the MS is attached, avoiding redundant classmark retransmissions over the radio interface. This is sometimes called the "idle-mode classmark" principle.

***** END OF 5th CHANGE

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.060 CR 523** ⌘ rev **2** ⌘ Current version: **5.9.0** ⌘

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:	⌘ RIM-NACC clean up		
Source:	⌘ 3GPP TSG_SA WG2		
Work item code:	⌘ TEI-5	Date:	⌘ 1/2/2005
Category:	⌘ F Use <u>one</u> 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 .		Release: ⌘ Rel-5 Use <u>one</u> of the following releases: Ph2 (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) Rel-7 (Release 7)

Reason for change:	⌘ Correction were made for RIM in TS 48.018. This CR aligns the RIM description in TS 23.060 with these corrections. The alignment is mainly a generalization of the RIM description by removing detailed procedures provided for RIM applications that are defined in TS 48.018. Reference to RIM description in TS 48.018 is made instead.
Summary of change:	⌘ Alignment of 23.060 RIM description with corrections made in TS 48.018.
Consequences if not approved:	⌘ Discrepancies in RIM descriptions of different specifications.

Clauses affected:	⌘ 8.1.5						
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> Other core specifications ⌘	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Y	N						
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X							
<input checked="" type="checkbox"/>							
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.

8.1.5 RAN Information Management (RIM) procedures

8.1.5.1 General

The RAN Information Management (RIM) procedures ~~provide~~~~are used as a~~ generic ~~mechanism~~~~procedures~~ for the exchange of arbitrary information between applications belonging to the RAN nodes. ~~An application using the RIM procedures is the External Network Assisted Cell Change (NACC).~~ The RAN information is transferred via the SGSN core network node(s). In order to make the RAN information transparent for the Core Network, ~~the message(s) conveying~~ the RAN information is included in a RIM container that shall not be interpreted by the Core Network nodes. ~~For future extensibility of this generic mechanism to features other than external NACC, the container includes independent Container Units that can be customised for different applications.~~

The RIM procedures are optional both in the BSC and in the SGSN and are negotiated at start/restart of the Gb link.

The RAN information is transferred in RIM containers from the source BSC to the destination BSC by use of ~~messages~~~~the generic RAN Information Send procedure~~. Each message carrying the RIM container is routed and relayed independently by the SGSN(s). Any relation between messages is transparent for the SGSN, i.e. a request/response exchange between RIM applications, for example, is routed and relayed as two independent messages by the SGSN.~~The RAN Information Send procedure may include a request for acknowledgement to secure the end-to-end transport via multiple intermediate nodes. A BSC may also request information, or request to stop the transmission of information from another BSC by use of the RAN Information Request procedure which might be applicable e.g. at BSC restart procedure.~~

The interfaces which will be used are the Gb (BSSGP) and the Gn (GTP) interfaces. The RAN information in the RIM container shall be transparent for the Core Network. An SGSN supporting the RIM procedures provides addressing, routing and relay functions.

8.1.5.2 Addressing, routing and relaying

8.1.5.2.1 Addressing

All the messages used for the exchange of RANIM information contain ~~in their header~~ the addresses of the source and destination BSSs. A BSS is addressed by Routing Area Identity (RAI) + Cell Identity (CI) of one of its cells.~~Source and destination address have the same format. Each address contains:~~

- ~~— Mobile Country Code (MCC)~~
- ~~— Mobile Network Code (MNC)~~
- ~~— Location Area Code (LAC)~~
- ~~— Routing Area Code (RAC)~~
- ~~— Cell Identity (CI)~~

8.1.5.2.2 Routing

The following description applies to all the messages used for the exchange of RANIM information.

The source BSS sends a message on the Gb interface to its SGSN including the source and destination addresses. From the Routing Area Identity (MCC+MNC+LAC+RAC) of the destination BSS address, the SGSN shall decide whether or not it is connected to the destination BSS.

If the SGSN is not connected to the destination BSS, then it shall use the RAI to route the message encapsulated in a GTP message to the correct SGSN via the Gn interface.

The SGSN connected to the destination BSS decides which BSS to send the message~~it~~ to based on the ~~CI of the~~ destination address.

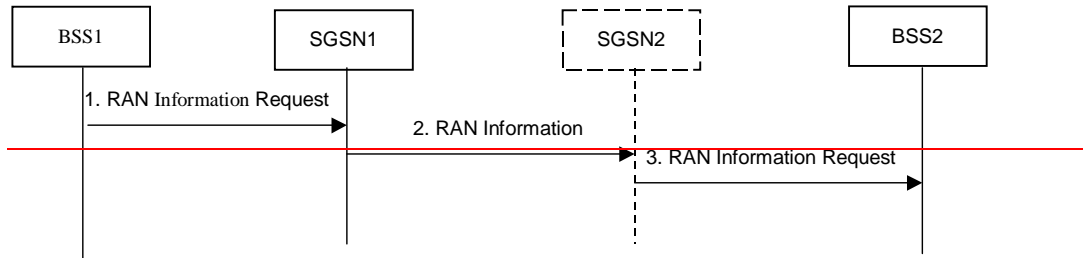
8.1.5.2.3 Relaying

The SGSN performs relaying between BSSGP messages and GTP messages as described in 3GPP TS 29.060 [26].

8.1.5.3 ~~void~~RAN Information Request procedure

~~The RAN Information Request procedure is used to request information or to stop transmission of event driven information from another BSS.~~

~~The RAN Information Request procedure is illustrated in Figure 56a.~~



~~Figure 56a — RAN Information Request procedure.~~

- ~~1) — The RAN Information Request procedure is initiated by the BSS1 by sending the RAN INFORMATION REQUEST message with the application information and with the message header including the addresses of the source and destination BSSs. The destination BSS is the BSS2 from which the information is required.~~
- ~~2) — The SGSN1 determines from the Routing Area Identity (MCC+MNC+LAC+RAC) in the address of BSS2 whether or not it is connected to BSS2. If the SGSN1 is not directly connected to BSS2, then it shall use the RAI to route the message to SGSN2 via the Gn interface.~~
- ~~3) — The SGSN2 sends the message to BSS2 via the Gb interface based on the CI of the destination address.~~

~~The RAN Information Request procedure initiates the RAN Information send procedure as described in clause 8.1.5.4.~~

8.1.5.4 ~~void~~RAN Information Send procedure

~~This procedure may be event triggered (e.g. change of System Information for external NACC) or scheduled (e.g. by a RAN Information Request procedure). The RAN Information Send procedure is illustrated in Figure 56b.~~

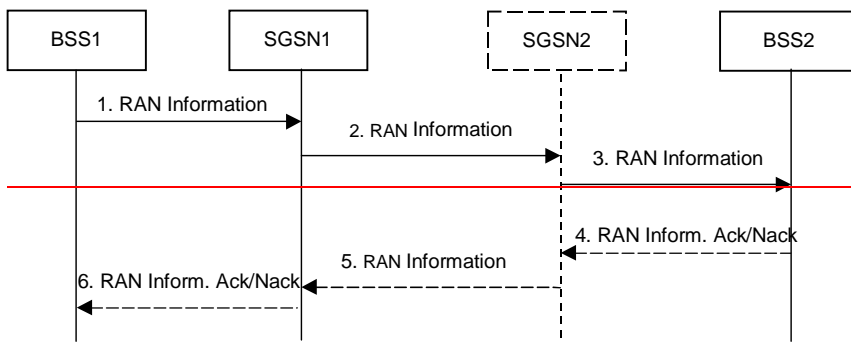


Figure 56b — RAN Information Send procedure.

- 1) The RAN Information Send procedure is initiated by the BSS1 when it has information to be sent, or if the information has been previously requested by a RAN Information Request procedure (see sub-clause 8.1.5.3). The procedure is initiated by sending a RAN INFORMATION message with application information and with the message header including the addresses of the source and destination BSSs. The destination BSS is the BSS2 to which the information is sent.
- 2) The SGSN1 determines from the Routing Area Identity (MCC+MNC+LAC+RAC), whether or not it is connected to BSS2. If the SGSN1 is not directly connected to BSS2, then it shall use the RAI to route the message to SGSN2 via the Gn interface.
- 3) The SGSN2 sends the message to BSS2 via the Gb interface based on the CI of the destination address. The RAN INFORMATION message received at the BSS2 contains an indication of whether or not acknowledgement is needed. If such indication is not present, the procedure concludes.
- 4) If the RAN INFORMATION message requests for acknowledgement, the BSS2 shall send a RAN INFORMATION ACK/NACK message to its SGSN via the Gb interface.
- 5) The SGSN2 determines from the Routing Area Identity (MCC+MNC+LAC+RAC) of the destination BSS address, whether or not it is connected to BSS1. If the SGSN2 is not directly connected to BSS1, then it shall use the RAI to route the message to SGSN1 via the Gn interface.
- 6) The SGSN1 sends the message to BSS1 via the Gb interface based on the CI of the destination address. The RAN Information Send procedure is completed when the BSS1 receives the RAN INFORMATION ACK/NACK message.

8.1.5.5 Applications using the RIM Procedures

The RAN node applications, which use the RIM procedures, are fully transparent for the SGSN. Such applications are described in RAN specifications. An example is the Network Assisted Cell Change described in 3GPP TS 48.018 [78].

The first application using the RIM procedures is the Network Assisted Cell Change (NACC) application. The Network Assisted Cell Change (NACC) function reduces the service outage time at cell re-selection. The support is given to the mobile stations as system information for the target cell before the mobile station performs the cell re-selection. If cell re-selection is performed between cells controlled by different PCUs (external cells) the system information is made available to the mobile station via the External NACC function. The SGSN and the BSC may provide the external NACC function. If provided, changes in system information for a cell with external neighbouring cells will be the event

~~which triggers the transfer of the information from the source BSC to the target BSC(s) responsible for the external neighbouring cells.~~

~~The system information is transferred in containers from the source BSC to the destination BSC by use of the generic RAN Information Send procedure. The RAN Information Send procedure may include a request for acknowledgement to secure the end-to-end transport via multiple intermediate nodes.~~

~~A BSC may also request information, or request to stop the transmission of information from another BSC by use of the RAN Information Request procedure.~~

CR-Form-v7.1

CHANGE REQUEST

23.060 **CR 524** rev 2 Current version: 6.7.0

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:	☞ RIM-NACC clean up		
Source:	☞ 3GPP TSG_SA WG2		
Work item code:	☞ TEI-6	Date:	☞ 1/2/2005
Category:	☞ F	Release:	☞ Rel-6
	Use <u>one</u> 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 <u>one</u> of the following releases: Ph2 (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) Rel-7 (Release 7)

Reason for change:	☞ Correction were made for RIM in TS 48.018. Furthermore, RIM is extended to the use the lu interface too. This CR aligns the RIM description in TS 23.060 with these corrections. The alignment is mainly a generalization of the RIM description by removing detailed procedures provided for RIM applications that are defined in TS 48.018. Reference to RIM description in TS 48.018 is made instead.
Summary of change:	☞ Alignment of 23.060 RIM description with corrections and additions made in TS 48.018.
Consequences if not approved:	☞ Discrepancies in RIM descriptions of different specifications.

Clauses affected:	☞ 8.1.5						
Other specs affected:	<table border="1" style="border-collapse: collapse;"> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">N</td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications ☞ Test specifications ☞ O&M Specifications ☞	
Y	N						
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
Other comments:	☞						

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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.

8.1.5 RAN Information Management (RIM) procedures

8.1.5.1 General

The RAN Information Management (RIM) procedures ~~provide~~~~are used as a~~ generic ~~mechanism~~~~procedures~~ for the exchange of arbitrary information between applications belonging to the RAN nodes. ~~An application using the RIM procedures is the External Network Assisted Cell Change (NACC).~~ The RAN information is transferred via the SGSN core network node(s). In order to make the RAN information transparent for the Core Network, ~~the message(s) conveying~~ the RAN information is included in a RIM container that shall not be interpreted by the Core Network nodes. ~~For future extensibility of this generic mechanism to features other than external NACC, the container includes independent Container Units that can be customised for different applications.~~

The RIM procedures are optional both in the RAN nodeBSC and in the SGSN. ~~For the Gb interface the use of RIM procedures is~~~~and are~~ negotiated at start/restart of the Gb link. ~~For the Iu interface there is no negotiation of using RIM procedures or not at Iu link start/restart.~~

The RAN information is transferred in RIM containers from the source RAN nodeBSC to the destination RAN nodeBSC by use of ~~messages~~~~the generic RAN Information Send procedure~~. ~~Each message carrying the RIM container is routed and relayed independently by the SGSN(s). Any relation between messages is transparent for the SGSN, i.e. a request/response exchange between RIM applications, for example, is routed and relayed as two independent messages by the SGSN.~~ ~~The RAN Information Send procedure may include a request for acknowledgement to secure the end-to-end transport via multiple intermediate nodes. A BSC may also request information, or request to stop the transmission of information from another BSC by use of the RAN Information Request procedure which might be applicable e.g. at BSC restart procedure.~~

The interfaces which will be used are the Gb (BSSGP), ~~the Iu (RANAP)~~ and the Gn (GTP) interfaces. The RAN information in the RIM container shall be transparent for the Core Network. An SGSN supporting the RIM procedures provides addressing, routing and relay functions.

8.1.5.2 Addressing, routing and relaying

8.1.5.2.1 Addressing

All the messages used for the exchange of RANIM information contain ~~in their header~~ the addresses of the source and destination RAN nodesBSSs. ~~Source and destination address have the same format. A BSS is addressed by Routing Area Identity (RAI) + Cell Identity (CI) of one of its cells. An RNC is addressed by Global RNC-Id.~~ ~~Each address contains:~~

- ~~— Mobile Country Code (MCC)~~
- ~~— Mobile Network Code (MNC)~~
- ~~— Location Area Code (LAC)~~
- ~~— Routing Area Code (RAC)~~
- ~~— Cell Identity (CI)~~

8.1.5.2.2 Routing

The following description applies to all the messages used for the exchange of RANIM information.

The source RAN nodeBSS sends a message ~~on the Gb interface~~ to its SGSN including the source and destination addresses. ~~An RNC sends in addition a RIM routing address, which is a copy of the destination address.~~ From the ~~Routing Area Identity (MCC+MNC+LAC+RAC) of the~~ destination ~~BSS~~ address ~~or from the RIM routing address~~, the SGSN shall decide whether or not it is connected to the destination RAN nodeBSS.

If the SGSN is not connected to the destination RAN nodeBSS, then it shall use the destination address or the RIM routing addressRAI to route the message encapsulated in a GTP message to the correct SGSN via the Gn interface. If the destination address or RIM routing address identifies an RNC the SGSN includes the RIM routing address in the GTP message. If the SGSN received the message from a BSC it copies the destination address from the message into the RIM routing address.

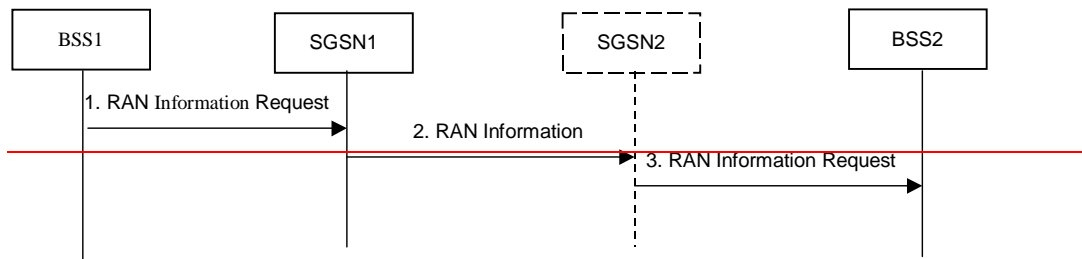
The SGSN connected to the destination [RAN nodeBSS](#) decides which [RAN nodeBSS](#) to send [the message#](#) to based on the ~~CI of the~~ destination address [or on the RIM routing address](#).

8.1.5.2.3 Relaying

The SGSN performs relaying between BSSGP messages, [RANAP messages](#) and GTP messages [as described in 3GPP TS 48.018 \[78\], 3GPP TS 25.413 \[56b\] and 3GPP TS 29.060 \[26\]](#).

8.1.5.3 ~~void~~RAN Information Request procedure

~~The RAN Information Request procedure is used to request information or to stop transmission of event driven information from another BSC.
The RAN Information Request procedure is illustrated in Figure 56a.~~



~~Figure 56a — RAN Information Request procedure.~~

- ~~1) — The RAN Information Request procedure is initiated by the BSS1 by sending the RAN INFORMATION REQUEST message with the application information and with the message header including the addresses of the source and destination BSSs. The destination BSS is the BSS2 from which the information is required.~~
- ~~2) — The SGSN1 determines from the Routing Area Identity (MCC+MNC+LAC+RAC) in the address of BSS2 whether or not it is connected to BSS2. If the SGSN1 is not directly connected to BSS2, then it shall use the RAI to route the message to SGSN2 via the Gn interface.~~
- ~~3) — The SGSN2 sends the message to BSS2 via the Gb interface based on the CI of the destination address.~~

~~The RAN Information Request procedure initiates the RAN Information send procedure as described in clause 8.1.5.4.~~

8.1.5.4 ~~void~~RAN Information Send procedure

~~This procedure may be event triggered (e.g. change of System Information for external NACC) or scheduled (e.g. by a RAN Information Request procedure). The RAN Information Send procedure is illustrated in Figure 56b.~~

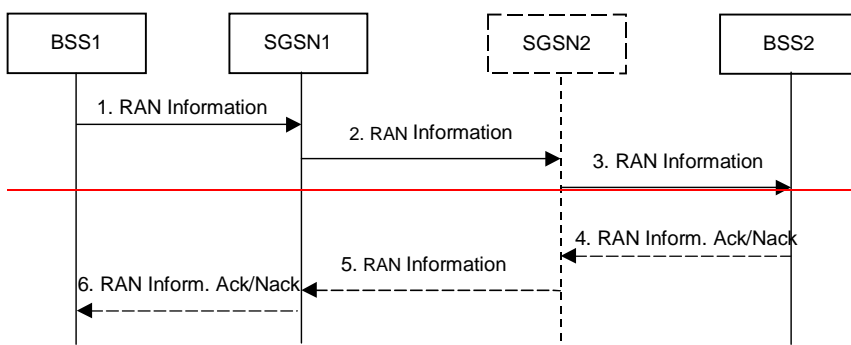


Figure 56b — RAN Information Send procedure.

- 1) The RAN Information Send procedure is initiated by the BSS1 when it has information to be sent, or if the information has been previously requested by a RAN Information Request procedure (see sub-clause 8.1.5.3). The procedure is initiated by sending a RAN INFORMATION message with application information and with the message header including the addresses of the source and destination BSSs. The destination BSS is the BSS2 to which the information is sent.
- 2) The SGSN1 determines from the Routing Area Identity (MCC+MNC+LAC+RAC), whether or not it is connected to BSS2. If the SGSN1 is not directly connected to BSS2, then it shall use the RAI to route the message to SGSN2 via the Gn interface.
- 3) The SGSN2 sends the message to BSS2 via the Gb interface based on the CI of the destination address. The RAN INFORMATION message received at the BSS2 contains an indication of whether or not acknowledgement is needed. If such indication is not present, the procedure concludes.
- 4) If the RAN INFORMATION message requests for acknowledgement, the BSS2 shall send a RAN INFORMATION ACK/NACK message to its SGSN via the Gb interface.
- 5) The SGSN2 determines from the Routing Area Identity (MCC+MNC+LAC+RAC) of the destination BSS address, whether or not it is connected to BSS1. If the SGSN2 is not directly connected to BSS1, then it shall use the RAI to route the message to SGSN1 via the Gn interface.
- 6) The SGSN1 sends the message to BSS1 via the Gb interface based on the CI of the destination address. The RAN Information Send procedure is completed when the BSS1 receives the RAN INFORMATION ACK/NACK message.

8.1.5.5 Applications using the RIM Procedures

The RAN node applications, which use the RIM procedures, are fully transparent for the SGSN. These applications are described in RAN specifications. An example is the Network Assisted Cell Change described in 3GPP TS 48.018 [78] and 3GPP TS 25.413 [56b].

The first application using the RIM procedures is the Network Assisted Cell Change (NACC) application. The Network Assisted Cell Change (NACC) function reduces the service outage time at cell re-selection. The support is given to the mobile stations as system information for the target cell before the mobile station performs the cell re-selection. If cell re-selection is performed between cells controlled by different PCUs (external cells) the system information is made available to the mobile station via the External NACC function. The SGSN and the BSC may provide the external

~~NACC function. If provided, changes in system information for a cell with external neighbouring cells will be the event which triggers the transfer of the information from the source BSC to the target BSC(s) responsible for the external neighbouring cells.~~

~~The system information is transferred in containers from the source BSC to the destination BSC by use of the generic RAN Information Send procedure. The RAN Information Send procedure may include a request for acknowledgement to secure the end-to-end transport via multiple intermediate nodes.~~

~~A BSC may also request information, or request to stop the transmission of information from another BSC by use of the RAN Information Request procedure.~~

CHANGE REQUEST

23.060 CR 525 rev - Current version: 5.9.0

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:	Correction of Packet Flow ID Allocation		
Source:	3GPP TSG_SA WG2		
Work item code:	TEI-5	Date:	26/1/2005
Category:	F	Release:	Rel-5
	<p>Use <u>one</u> of the following categories:</p> <p>F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>		<p>Use <u>one</u> of the following releases:</p> <p>Ph2 (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) Rel-7 (Release 7)</p>

Reason for change:	<p>TS 23.060 requires to suppress the allocation of a Packet Flow ID (PFI) to an MS when the BSS does not support the related PFC procedures. However, the UE may move between BSSs, i.e. the Packet Flow ID may be allocated when in the service area of a supporting BSS and when the UE moves to a non-supporting BSS the MS shall not send the PFI to that BSS.</p> <p>So there is no need to suppress the PFI allocation when the BSS does not support PFC procedures. In addition this would avoid the overhead of PDP context modification procedures an MS or the SGSN needs to perform when entering the first time the area of a supporting BSS with PDP contexts that were allocated via a non-supporting BSS. As this is obviously implementation specific it results in non-deterministic usage of PFC procedures in such situations.</p>
Summary of change:	The restriction of not allocating packet flow IDs when the BSS is not supporting the PFC procedures is removed.
Consequences if not approved:	Useless functionality that results in non-deterministic usage of PFC procedures. It remains ambiguous whether allocation of a PFI by PDP modification procedures at BSS change is task of MS or of SGSN or implementation specific.


Clauses affected:	9.2.2.1, 9.2.2.2, 9.2.3.1, 9.2.3.2, 9.2.3.3						
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;">Y</td> <td style="text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications	<input type="checkbox"/>
Y	N						
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	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Test specifications	<input type="checkbox"/>		
<input type="checkbox"/>	<input checked="" type="checkbox"/>						

Other comments:



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- 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.

9.2.2.1 PDP Context Activation Procedure

The PDP Context Activation procedure is illustrated in Figure 63 and Figure 64.

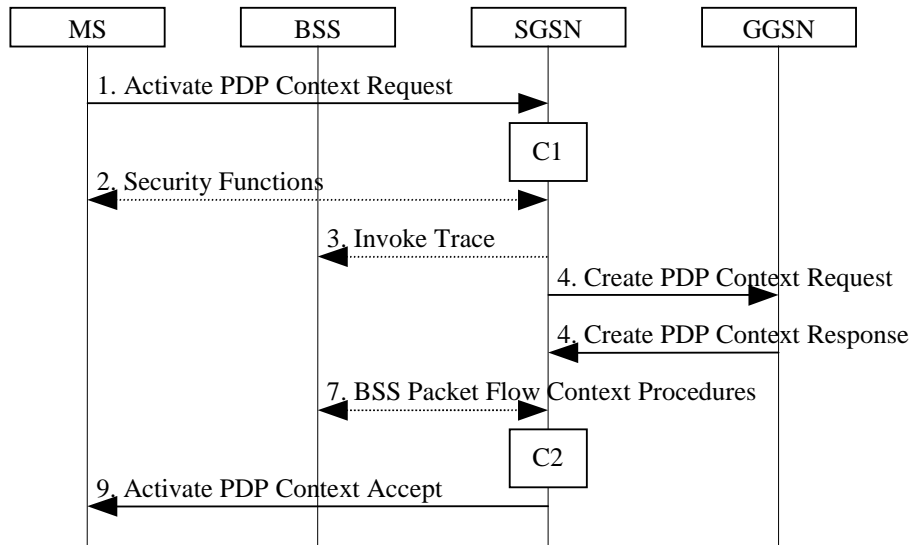


Figure 63: PDP Context Activation Procedure for A/Gb mode

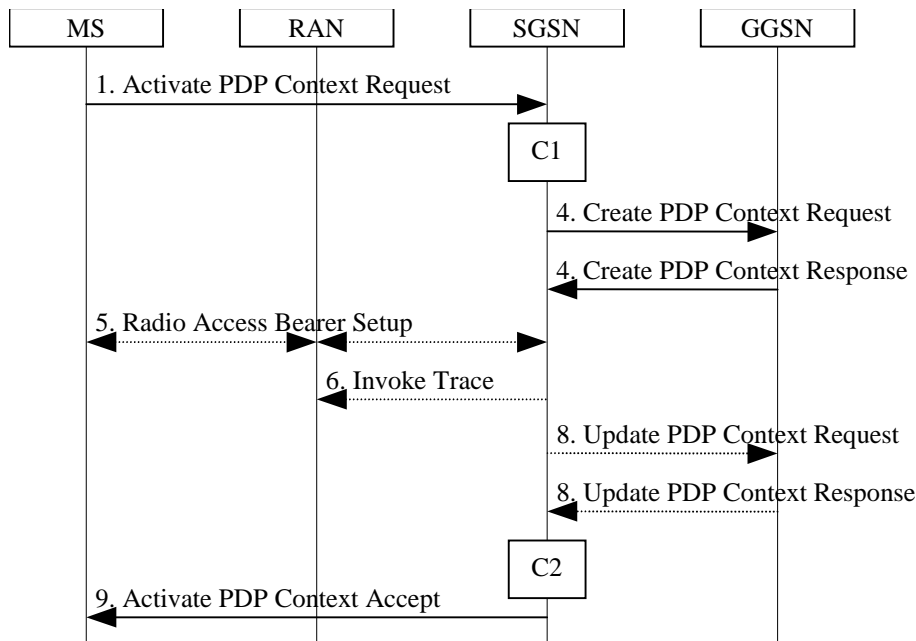


Figure 64: PDP Context Activation Procedure for Iu mode

- 1) The MS sends an Activate PDP Context Request (NSAPI, TI, PDP Type, PDP Address, Access Point Name, QoS Requested, PDP Configuration Options) message to the SGSN. The MS shall use PDP Address to indicate whether it requires the use of a static PDP address or whether it requires the use of a dynamic PDP address. The MS shall leave PDP Address empty to request a dynamic PDP address. The MS may use Access Point Name to select a reference point to a certain packet data network and/or to select a service. Access Point Name is a logical name referring to the packet data network and/or to a service that the subscriber wishes to connect to. QoS Requested indicates the desired QoS profile. PDP Configuration Options may be used to transfer optional PDP parameters and/or request to the GGSN (see GSM 29.060 [26] and 24.229 [75]). PDP Configuration Options is sent transparently through the SGSN.
- 2) In A/Gb mode, security functions may be executed. These procedures are defined in clause "Security Function".

- 3) In A/Gb mode and if BSS trace is activated, the SGSN shall send an Invoke Trace (Trace Reference, Trace Type, Trigger Id, OMC Identity) message to the BSS. Trace Reference, and Trace Type are copied from the trace information received from the HLR or OMC.
- 4) The SGSN validates the Activate PDP Context Request using PDP Type (optional), PDP Address (optional), and Access Point Name (optional) provided by the MS and the PDP context subscription records. The validation criteria, the APN selection criteria, and the mapping from APN to a GGSN are described in annex A.

If no GGSN address can be derived or if the SGSN has determined that the Activate PDP Context Request is not valid according to the rules described in annex A, the SGSN rejects the PDP context activation request.

If a GGSN address can be derived, the SGSN creates a TEID for the requested PDP context. If the MS requests a dynamic address, the SGSN lets a GGSN allocate the dynamic address. The SGSN may restrict the requested QoS attributes given its capabilities and the current load, and it shall restrict the requested QoS attributes according to the subscribed QoS profile.

The SGSN sends a Create PDP Context Request (PDP Type, PDP Address, Access Point Name, QoS Negotiated, TEID, NSAPI, MSISDN, Selection Mode, Charging Characteristics, Trace Reference, Trace Type, Trigger Id, OMC Identity, PDP Configuration Options, serving network identity) message to the affected GGSN. The SGSN should send the serving network identity to the GGSN. Access Point Name shall be the APN Network Identifier of the APN selected according to the procedure described in Annex A. PDP Address shall be empty if a dynamic address is requested. The GGSN may use Access Point Name to find a packet data network and optionally to activate a service for this APN. Selection Mode indicates whether a subscribed APN was selected, or whether a non-subscribed APN sent by an MS or a non-subscribed APN chosen by the SGSN was selected. Selection Mode is set according to Annex A. The GGSN may use Selection Mode when deciding whether to accept or reject the PDP context activation. For example, if an APN requires subscription, the GGSN is configured to accept only the PDP context activation that requests a subscribed APN as indicated by the SGSN with Selection Mode. Charging Characteristics indicates which kind of charging the PDP context is liable for. The charging characteristics on the GPRS subscription and individually subscribed APNs as well as the way the SGSN handles Charging Characteristics and chooses to send them or not to the GGSN is defined in 3GPP TS 32.215 [70]. The SGSN shall include Trace Reference, Trace Type, Trigger Id, and OMC Identity if GGSN trace is activated. The SGSN shall copy Trace Reference, Trace Type, and OMC Identity from the trace information received from the HLR or OMC.

The GGSN creates a new entry in its PDP context table and generates a Charging Id. The new entry allows the GGSN to route PDP PDUs between the SGSN and the packet data network, and to start charging. The way the GGSN handles Charging Characteristics that it may have received from the SGSN is defined in 3GPP TS 32.215 [70]. The GGSN may restrict QoS Negotiated given its capabilities, operator policies and the current load. The GGSN then returns a Create PDP Context Response (TEID, PDP Address, PDP Configuration Options, QoS Negotiated, Charging Id, Cause) message to the SGSN. PDP Address is included if the GGSN allocated a PDP address. If the GGSN has been configured by the operator to use External PDN Address Allocation for the requested APN, PDP Address shall be set to 0.0.0.0, indicating that the PDP address shall be negotiated by the MS with the external PDN after completion of the PDP Context Activation procedure. The GGSN shall relay, modify and monitor these negotiations as long as the PDP context is in ACTIVE state, and use the GGSN-Initiated PDP Context Modification procedure to transfer the currently used PDP address to the SGSN and the MS. PDP Configuration Options contain optional PDP parameters that the GGSN may transfer to the MS. These optional PDP parameters may be requested by the MS in the Activate PDP Context Request message, or may be sent unsolicited by the GGSN. PDP Configuration Options is sent transparently through the SGSN. The Create PDP Context messages are sent over the backbone network.

If QoS Negotiated received from the SGSN is incompatible with the PDP context being activated, the GGSN rejects the Create PDP Context Request message. The GGSN operator configures the compatible QoS profiles.

- 5) In Iu mode, RAB setup is done by the RAB Assignment procedure, see subclause "RAB Assignment Procedure".
- 6) In Iu mode and if BSS trace is activated, the SGSN shall send an Invoke Trace (Trace Reference, Trace Type, Trigger Id, OMC Identity) message to the RAN. Trace Reference, and Trace Type are copied from the trace information received from the HLR or OMC.
- 7) In A/Gb mode, BSS packet flow context procedures may be executed. These procedures are defined in clause "BSS Context".

- 8) In Iu mode and in case the QoS attributes have been downgraded in step 5, the SGSN may inform the GGSN about the downgraded QoS attributes by sending an Update PDP Context Request to the affected GGSN. The GGSN confirms the new QoS attributes by sending an Update PDP Context Response to the SGSN.
- 9) The SGSN inserts the NSAPI along with the GGSN address in its PDP context. If the MS has requested a dynamic address, the PDP address received from the GGSN is inserted in the PDP context. The SGSN selects Radio Priority and Packet Flow Id based on QoS Negotiated, and returns an Activate PDP Context Accept (PDP Type, PDP Address, TI, QoS Negotiated, Radio Priority, Packet Flow Id, PDP Configuration Options) message to the MS. If the MS indicated in the MS Network Capability it does not support BSS packet flow procedures ~~or if the BSS does not support BSS packet flow procedures~~, then the SGSN should not include the Packet Flow Id. PDP Configuration Options may be used to transfer optional PDP parameters to the UE (see GSM 29.060 [26] and 24.229 [75]). PDP Configuration Options is sent transparently through the SGSN. The SGSN is now able to route PDP PDUs between the GGSN and the MS, and to start charging.

For each PDP Address a different quality of service (QoS) profile may be requested. For example, some PDP addresses may be associated with E-mail that can tolerate lengthy response times. Other applications cannot tolerate delay and demand a very high level of throughput, interactive applications being one example. These different requirements are reflected in the QoS profile. The QoS profile is defined in clause "Quality of Service Profile". If a QoS requirement is beyond the capabilities of a PLMN, the PLMN negotiates the QoS profile as close as possible to the requested QoS profile. The MS either accepts the negotiated QoS profile, or deactivates the PDP context.

After an SGSN has successfully updated the GGSN, the PDP contexts associated with an MS is distributed as shown in clause "Information Storage".

If the PDP Context Activation Procedure fails or if the SGSN returns an Activate PDP Context Reject (Cause, PDP Configuration Options) message, the MS may attempt another activation to the same APN up to a maximum number of attempts.

The CAMEL procedure calls shall be performed, see referenced procedures in 3GPP TS 23.078:

- C1) CAMEL_GPRS_PDP_Context_Establishment.

In Figure 63 and Figure 64, procedures return as result "Continue".

- C2) CAMEL_GPRS_PDP_Context_Establishment_Acknowledgement.

In Figure 63 and Figure 64, procedures return as result "Continue".

9.2.2.1.1 Secondary PDP Context Activation Procedure

The Secondary PDP Context Activation procedure may be used to activate a PDP context while reusing the PDP address and other PDP context information from an already active PDP context, but with a different QoS profile. Procedures for APN selection and PDP address negotiation are not executed. A unique TI and a unique NSAPI shall identify each PDP context sharing the same PDP address and APN.

The Secondary PDP Context Activation procedure may be executed without providing a Traffic Flow Template (TFT) to the newly activated PDP context if all other active PDP contexts for this PDP address and APN already have an associated TFT. Otherwise a TFT shall be provided. The TFT contains attributes that specify an IP header filter that is used to direct data packets received from the interconnected packet data network to the newly activated PDP context.

The Secondary PDP Context Activation procedure may only be initiated after a PDP context is already activated for the same PDP address and APN. The procedure is illustrated in Figure 65 and Figure 66.

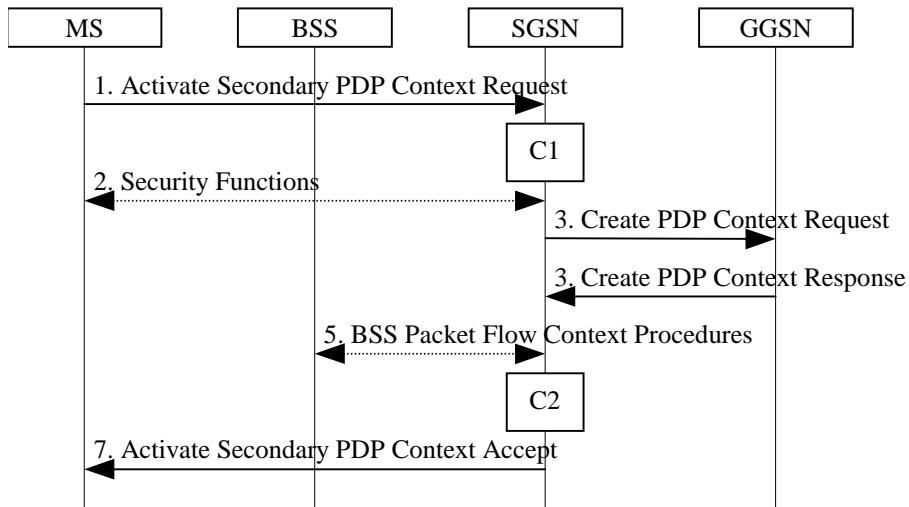


Figure 65: Secondary PDP Context Activation Procedure for A/Gb mode

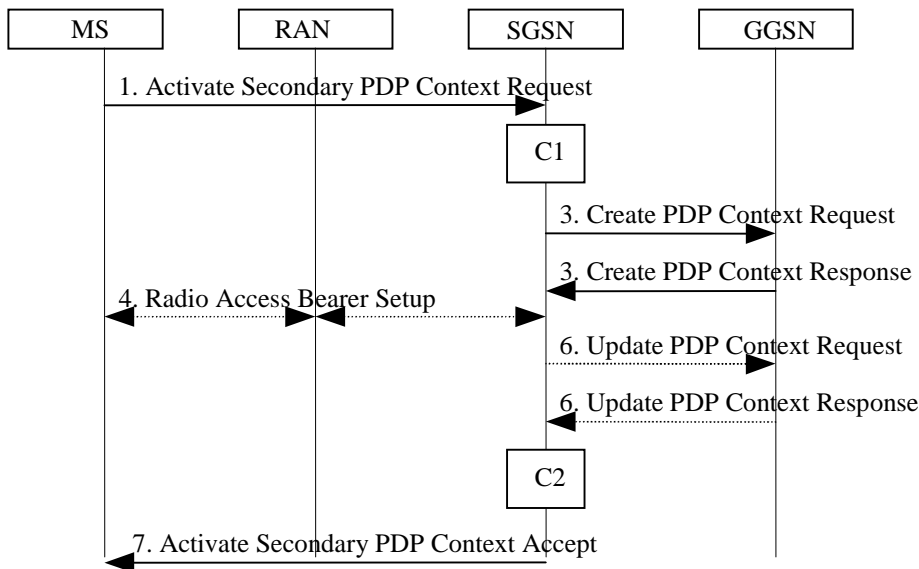


Figure 66: Secondary PDP Context Activation Procedure for Iu mode

- 1) The MS sends an Activate Secondary PDP Context Request (Linked TI, NSAPI, TI, QoS Requested, TFT, PDP Configuration Options) message to the SGSN. Linked TI indicates the TI value assigned to any one of the already activated PDP contexts for this PDP address and APN. QoS Requested indicates the desired QoS profile. TFT is sent transparently through the SGSN to the GGSN to enable packet classification for downlink data transfer. TI and NSAPI contain values not used by any other activated PDP context. PDP Configuration Options may be used to transfer optional PDP parameters and/or requests to the GGSN (see GSM 29.060 [26] and 24.229 [75]). PDP Configuration Options is sent transparently through the SGSN.
- 2) In A/Gb mode, security functions may be executed. These procedures are defined in clause "Security Function".
- 3) The SGSN validates the Activate Secondary PDP Context Request using the TI indicated by Linked TI. The same GGSN address is used by the SGSN as for the already-activated PDP context(s) for that TI and PDP address.

The SGSN may restrict the requested QoS attributes given its capabilities and the current load, and it shall restrict the requested QoS attributes according to the subscribed QoS profile, which represents the maximum QoS per PDP context to the associated APN. The GGSN may restrict and negotiate the requested QoS as specified in clause "PDP Context Activation Procedure". The SGSN sends a Create PDP Context Request (QoS Negotiated, TEID, NSAPI, Primary NSAPI, TFT, PDP Configuration Options, serving network identity) message to the affected GGSN. The SGSN should send the serving network identity to the GGSN. Primary NSAPI indicates the NSAPI value assigned to any one of the already activated PDP contexts for this PDP address and APN. TFT is included only if received in the Activate Secondary PDP Context Request message. PDP Configuration Options is sent transparently through the SGSN if received in the Activate secondary PDP Context Request message.

The GGSN uses the same packet data network as used by the already-activated PDP context(s) for that PDP address, generates a new entry in its PDP context table, and stores the TFT. The new entry allows the GGSN to route PDP PDUs via different GTP tunnels between the SGSN and the packet data network. The GGSN returns a Create PDP Context Response (TEID, QoS Negotiated, Cause, PDP Configuration Options) message to the SGSN. PDP Configuration Options may be used to transfer optional PDP parameters to the UE (see GSM 29.060 [26] and 24.229 [75]).

- 4) In Iu mode, RAB setup is done by the RAB Assignment procedure.
- 5) In A/Gb mode, BSS packet flow context procedures may be executed. These procedures are defined in clause "BSS Context".
- 6) In Iu mode and in case the QoS attributes have been downgraded in step 4, the SGSN may inform the GGSN about the downgraded QoS attributes by sending an Update PDP Context Request to the affected GGSN. The GGSN confirms the new QoS attributes by sending an Update PDP Context Response to the SGSN.
- 7) The SGSN selects Radio Priority and Packet Flow Id based on QoS Negotiated, and returns an Activate Secondary PDP Context Accept (TI, QoS Negotiated, Radio Priority, Packet Flow Id, PDP Configuration Options) message to the MS. If the MS indicated in the MS Network Capability it does not support BSS packet flow procedures ~~or if the BSS does not support BSS packet flow procedures~~, then the SGSN should not include the Packet Flow Id. PDP Configuration Options is sent transparently through the SGSN if received in the Create PDP Context Response message. The SGSN is now able to route PDP PDUs between the GGSN and the MS via different GTP tunnels and possibly different LLC links.

For each additionally activated PDP context a QoS profile and TFT may be requested.

If the secondary PDP context activation procedure fails or if the SGSN returns an Activate Secondary PDP Context Reject (Cause, PDP Configuration Options) message, the MS may attempt another activation with a different TFT, depending on the cause.

The CAMEL procedure calls shall be performed, see referenced procedures in 3GPP TS 23.078:

- C1) CAMEL_GPRS_PDP_Context_Establishment.

In Figure 65 and in Figure 66, procedures return as result "Continue".

- C2) CAMEL_GPRS_PDP_Context_Establishment_Acknowledgement.

In Figure 65 and in Figure 66, procedures return as result "Continue".

9.2.3.1 SGSN-Initiated PDP Context Modification Procedure

The SGSN-Initiated PDP Context Modification procedure is illustrated in Figure 70.

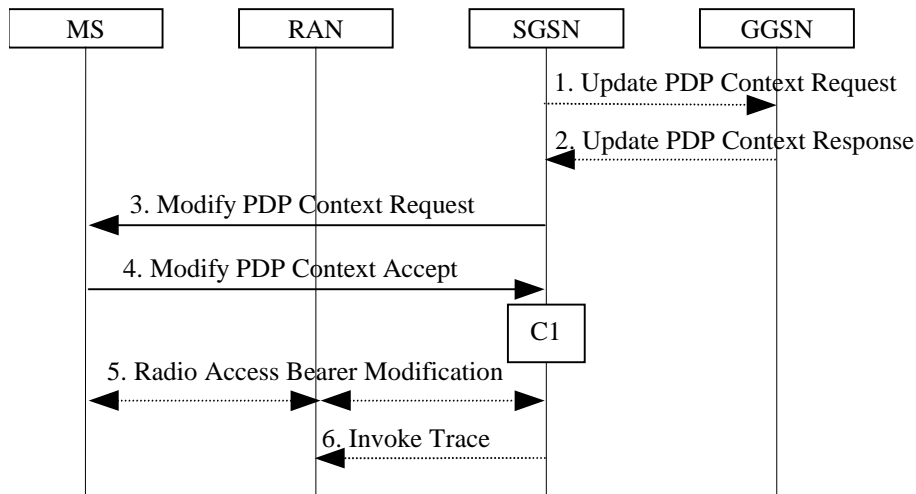


Figure 70: SGSN-Initiated PDP Context Modification Procedure

- 1) The SGSN may send an Update PDP Context Request (TEID, NSAPI, QoS Negotiated, Trace Reference, Trace Type, Trigger Id, OMC Identity, serving network identity) message to the GGSN. The SGSN should send the serving network identity to the GGSN. If QoS Negotiated received from the SGSN is incompatible with the PDP context being modified, the GGSN rejects the Update PDP Context Request. The GGSN operator configures the compatible QoS profiles. The SGSN shall include Trace Reference, Trace Type, Trigger Id, and OMC Identity in the message if GGSN trace is activated while the PDP context is active. The SGSN shall copy Trace Reference, Trace Type, and OMC Identity from the trace information received from the HLR or OMC.
- 2) The GGSN may restrict QoS Negotiated given its capabilities and the current load. The GGSN stores QoS Negotiated and returns an Update PDP Context Response (TEID, QoS Negotiated, Cause) message.
- 3) The SGSN selects Radio Priority and Packet Flow Id based on QoS Negotiated, and may send a Modify PDP Context Request (TI, QoS Negotiated, Radio Priority, Packet Flow Id) message to the MS. If the MS indicated in the MS Network Capability it does not support BSS packet flow procedures ~~or if the BSS does not support BSS packet flow procedures~~, then the SGSN should not include the Packet Flow Id.
- 4) The MS acknowledges by returning a Modify PDP Context Accept message. If the MS does not accept the new QoS Negotiated it shall instead de-activate the PDP context with the PDP Context Deactivation Initiated by the MS procedure.
- 5) In Iu mode, radio access bearer modification may be performed by the RAB Assignment procedure.
- 6) If BSS trace is activated while the PDP context is active, the SGSN shall send an Invoke Trace (Trace Reference, Trace Type, Trigger Id, OMC Identity) message to the RAN. Trace Reference, and Trace Type are copied from the trace information received from the HLR or OMC.

The CAMEL procedure calls shall be performed, see referenced procedure in 3GPP TS 23.078:

- C1) CAMEL_GPRS_Change_Of_QoS.

The procedure returns as result "Continue".

9.2.3.2 GGSN-Initiated PDP Context Modification Procedure

The GGSN-Initiated PDP Context Modification procedure is illustrated in Figure 71.

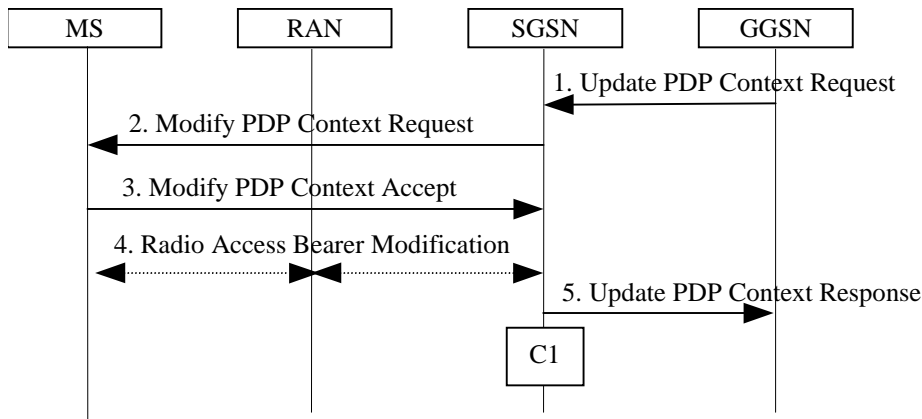


Figure 71: GGSN-Initiated PDP Context Modification Procedure

- 1) The GGSN sends an Update PDP Context Request (TEID, NSAPI, PDP Address, QoS Requested) message to the SGSN. QoS Requested indicates the desired QoS profile. PDP Address is optional.
- 2) The SGSN may restrict the desired QoS profile given its capabilities, the current load, the current QoS profile, and the subscribed QoS profile. The SGSN selects Radio Priority and Packet Flow Id based on QoS Negotiated, and sends a Modify PDP Context Request (TI, PDP Address, QoS Negotiated, Radio Priority, Packet Flow Id) message to the MS. PDP Address is optional. If the MS indicated in the MS Network Capability it does not support BSS packet flow procedures ~~or if the BSS does not support BSS packet flow procedures~~, then the SGSN should not include the Packet Flow Id.
- 3) The MS acknowledges by returning a Modify PDP Context Accept message. If the MS does not accept the new QoS Negotiated it shall instead de-activate the PDP context with the PDP Context Deactivation Initiated by MS procedure.
- 4) In Iu mode, radio access bearer modification may be performed by the RAB Assignment procedure.
- 5) Upon receipt of the Modify PDP Context Accept message, or upon completion of the RAB modification procedure, the SGSN returns an Update PDP Context Response (TEID, QoS Negotiated) message to the GGSN. If the SGSN receives a Deactivate PDP Context Request message, it shall instead follow the PDP Context Deactivation Initiated by MS procedure.

The CAMEL procedure calls shall be performed, see referenced procedure in 3GPP TS 23.078:

C1) CAMEL_GPRS_Change_Of_QoS.

The procedure returns as result "Continue".

9.2.3.3 MS-Initiated PDP Context Modification Procedure

The MS-Initiated PDP Context Modification procedure is illustrated in Figure 72.

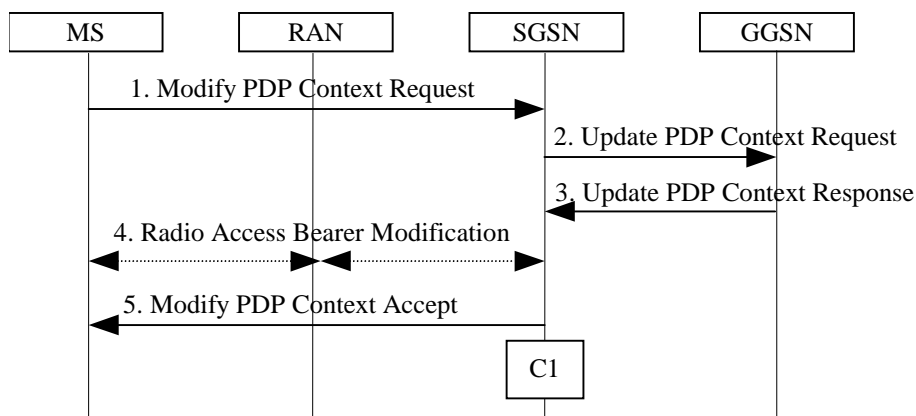


Figure 72: MS-Initiated PDP Context Modification Procedure

- 1) The MS sends a Modify PDP Context Request (TI, QoS Requested, TFT, PDP Configuration Options) message to the SGSN. Either QoS Requested or TFT or both may be included. QoS Requested indicates the desired QoS profile, while TFT indicates the TFT that is to be added or modified or deleted from the PDP context. PDP Configuration Options may be used to transfer optional PDP parameters and/or requests to the GGSN.
- 2) The SGSN may restrict the desired QoS profile given its capabilities, the current load, and the subscribed QoS profile. The SGSN sends an Update PDP Context Request (TEID, NSAPI, QoS Negotiated, TFT, PDP Configuration Options, serving network identity) message to the GGSN. The SGSN should send the serving network identity to the GGSN. If QoS Negotiated and/or TFT received from the SGSN is incompatible with the PDP context being modified (e.g., TFT contains inconsistent packet filters), the GGSN rejects the Update PDP Context Request. The GGSN operator configures the compatible QoS profile. PDP Configuration Options is sent transparently through the SGSN if received in Modify PDP Context Request message.
- 3) The GGSN may further restrict QoS Negotiated given its capabilities, operator policies and the current load. The GGSN stores QoS Negotiated, stores, modifies, or deletes TFT of that PDP context as indicated in TFT, and returns an Update PDP Context Response (TEID, QoS Negotiated, PDP Configuration Options) message. PDP Configuration Options may be used to transfer optional PDP parameters to the UE.
- 4) In Iu mode, radio access bearer modification may be performed by the RAB Assignment procedure. In case the radio access bearer does not exist the RAB setup is done by the RAB Assignment procedure.
- 5) The SGSN selects Radio Priority and Packet Flow Id based on QoS Negotiated, and returns a Modify PDP Context Accept (TI, QoS Negotiated, Radio Priority, Packet Flow Id, PDP Configuration Options) message to the MS. If the MS indicated in the MS Network Capability it does not support BSS packet flow procedures ~~or if the BSS does not support BSS packet flow procedures~~, then the SGSN should not include the Packet Flow Id. PDP Configuration Options is sent transparently through the SGSN if received in Modify PDP Context Response message.

NOTE1: If the SGSN does not accept QoS Requested, then steps 2 and 3 of this procedure are skipped, and the existing QoS Negotiated is returned to the MS in step 4.

NOTE2: In this release of the standards no procedure is defined that uses the Protocol Configuration Options in the PDP context modification procedure.

The CAMEL procedure calls shall be performed, see referenced procedure in 3GPP TS 23.078:

C1) CAMEL_GPRS_Change_Of_QoS.

The procedure returns as result "Continue".

CHANGE REQUEST

23.060 CR 526 rev - Current version: 6.7.0

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:	Correction of Packet Flow ID Allocation		
Source:	3GPP TSG_SA WG2		
Work item code:	TEI-6	Date:	26/1/2005
Category:	A	Release:	Rel-6
	Use <u>one</u> 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 <u>one</u> of the following releases: Ph2 (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) Rel-7 (Release 7)

Reason for change:	TS 23.060 requires to suppress the allocation of a Packet Flow ID (PFI) to an MS when the BSS does not support the related PFC procedures. However, the UE may move between BSSs, i.e. the Packet Flow ID may be allocated when in the service area of a supporting BSS and when the UE moves to a non-supporting BSS the MS shall not send the PFI to that BSS. So there is no need to suppress the PFI allocation when the BSS does not support PFC procedures. In addition this would avoid the overhead of PDP context modification procedures an MS or the SGSN needs to perform when entering the first time the area of a supporting BSS with PDP contexts that were allocated via a non-supporting BSS. As this is obviously implementation specific it results in non-deterministic usage of PFC procedures in such situations.
Summary of change:	The restriction of not allocating packet flow IDs when the BSS is not supporting the PFC procedures is removed.
Consequences if not approved:	Useless functionality that results in non-deterministic usage of PFC procedures. It remains ambiguous whether allocation of a PFI by PDP modification procedures at BSS change is task of MS or of SGSN or implementation specific.


Clauses affected:	9.2.2.1, 9.2.2.2, 9.2.3.1, 9.2.3.2, 9.2.3.3								
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;">Y</td> <td style="text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> </tr> </table> Other core specifications	Y	N		X		X		
Y	N								
	X								
	X								

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.

9.2.2.1 PDP Context Activation Procedure

The PDP Context Activation procedure is illustrated in Figure 63 and Figure 64.

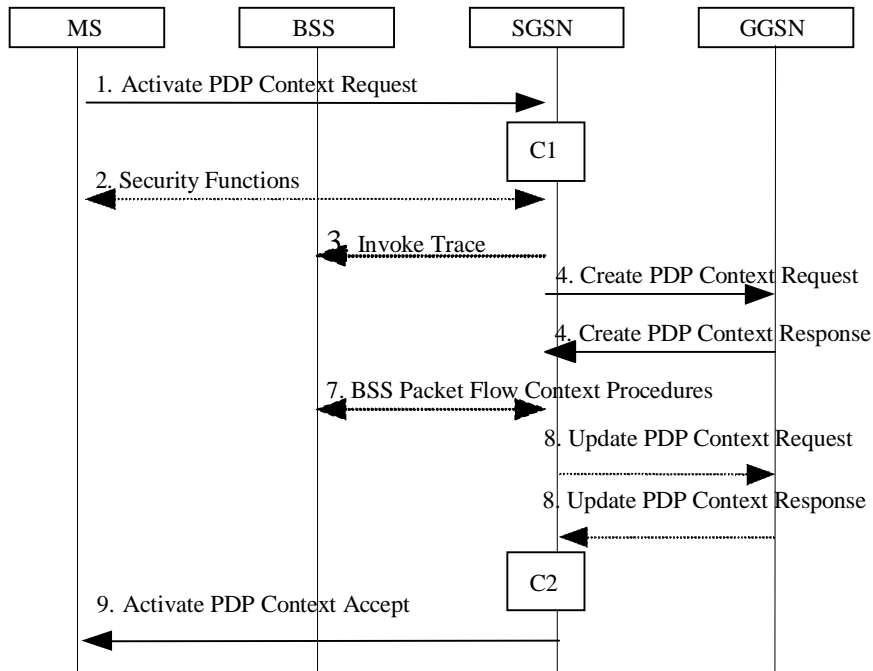


Figure 63: PDP Context Activation Procedure for A/Gb mode

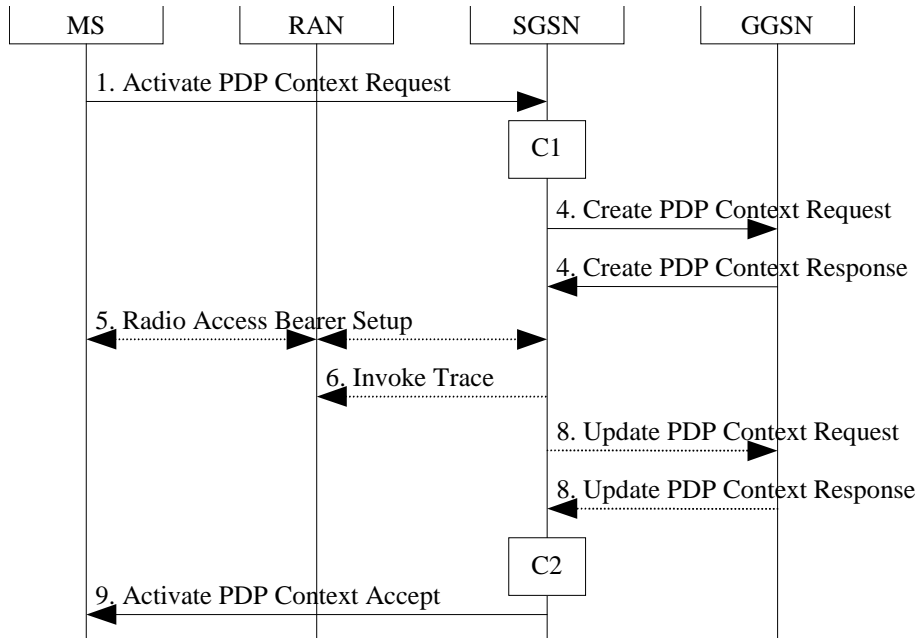


Figure 64: PDP Context Activation Procedure for Iu mode

- 1) The MS sends an Activate PDP Context Request (NSAPI, TI, PDP Type, PDP Address, Access Point Name, QoS Requested, PDP Configuration Options) message to the SGSN. The MS shall use PDP Address to indicate whether it requires the use of a static PDP address or whether it requires the use of a dynamic PDP address. The MS shall leave PDP Address empty to request a dynamic PDP address. The MS may use Access Point Name to select a reference point to a certain packet data network and/or to select a service. Access Point Name is a logical name referring to the packet data network and/or to a service that the subscriber wishes to connect to. QoS Requested indicates the desired QoS profile. PDP Configuration Options may be used to transfer optional PDP

parameters and/or request to the GGSN (see GSM 29.060 [26] and 24.229 [75]). PDP Configuration Options is sent transparently through the SGSN.

If the SGSN has stored a value for the Maximum APN restriction and the value indicates the most restrictive type, then the SGSN shall reject any Activate PDP Context requests to a different APN, using the PDP Context Activation Reject message including an appropriate error cause.

- 2) In A/Gb mode, security functions may be executed. These procedures are defined in clause "Security Function".
- 3) In A/Gb mode and if BSS trace is activated, the SGSN shall send an Invoke Trace (Trace Reference, Trace Type, Trigger Id, OMC Identity) message to the BSS. Trace Reference, and Trace Type are copied from the trace information received from the HLR or OMC.
- 4) The SGSN validates the Activate PDP Context Request using PDP Type (optional), PDP Address (optional), and Access Point Name (optional) provided by the MS and the PDP context subscription records. The validation criteria, the APN selection criteria, and the mapping from APN to a GGSN are described in annex A.

If no GGSN address can be derived or if the SGSN has determined that the Activate PDP Context Request is not valid according to the rules described in annex A, the SGSN rejects the PDP context activation request.

If a GGSN address can be derived, the SGSN creates a TEID for the requested PDP context. If the MS requests a dynamic address, the SGSN lets a GGSN allocate the dynamic address. The SGSN may restrict the requested QoS attributes given its capabilities and the current load, and it shall restrict the requested QoS attributes according to the subscribed QoS profile.

The SGSN sends a Create PDP Context Request (PDP Type, PDP Address, Access Point Name, QoS Negotiated, TEID, NSAPI, MSISDN, Selection Mode, Charging Characteristics, Trace Reference, Trace Type, Trigger Id, OMC Identity, PDP Configuration Options, serving network identity, Maximum APN Restriction IMEISV, CGI/SAI, RAT type, S-CDR CAMEL information) message to the affected GGSN. The SGSN shall send the serving network identity to the GGSN. Access Point Name shall be the APN Network Identifier of the APN selected according to the procedure described in Annex A. PDP Address shall be empty if a dynamic address is requested. The GGSN may use Access Point Name to find a packet data network and optionally to activate a service for this APN. Selection Mode indicates whether a subscribed APN was selected, or whether a non-subscribed APN sent by an MS or a non-subscribed APN chosen by the SGSN was selected. Selection Mode is set according to Annex A. The GGSN may use Selection Mode when deciding whether to accept or reject the PDP context activation. For example, if an APN requires subscription, the GGSN is configured to accept only the PDP context activation that requests a subscribed APN as indicated by the SGSN with Selection Mode. Charging Characteristics indicates which kind of charging the PDP context is liable for. The charging characteristics on the GPRS subscription and individually subscribed APNs as well as the way the SGSN handles Charging Characteristics and chooses to send them or not to the GGSN is defined in 3GPP TS 32.215 [70]. The SGSN shall include Trace Reference, Trace Type, Trigger Id, and OMC Identity if GGSN trace is activated. The SGSN shall copy Trace Reference, Trace Type, and OMC Identity from the trace information received from the HLR or OMC. The Maximum APN Restriction denotes the most stringent restriction as required by any already active PDP contexts. If there are no already active PDP contexts, this value is set to the least restrictive type (see subclause 15.4). If the GGSN receives the Maximum APN Restriction, then the GGSN shall check if the Maximum APN Restriction value does not conflict with the APN Restriction value associated with this PDP context request. If there is no conflict the request shall be allowed, otherwise the request shall be rejected with the SGSN sending a PDP Context Activation Reject Message to the MS including an appropriate error cause.

The GGSN creates a new entry in its PDP context table and generates a Charging Id. The new entry allows the GGSN to route PDP PDUs between the SGSN and the packet data network, and to start charging. The way the GGSN handles Charging Characteristics that it may have received from the SGSN is defined in 3GPP TS 32.215 [70]. The GGSN may restrict QoS Negotiated given its capabilities and the current load. The GGSN then returns a Create PDP Context Response (TEID, PDP Address, PDP Configuration Options, QoS Negotiated, Charging Id, Prohibit Payload Compression, APN Restriction, Cause) message to the SGSN. The Prohibit Payload Compression indicates that the SGSN should negotiate no data compression for this PDP context. PDP Address is included if the GGSN allocated a PDP address. If the GGSN has been configured by the operator to use External PDN Address Allocation for the requested APN, PDP Address shall be set to 0.0.0.0, indicating that the PDP address shall be negotiated by the MS with the external PDN after completion of the PDP Context Activation procedure. The GGSN shall relay, modify and monitor these negotiations as long as the PDP context is in ACTIVE state, and use the GGSN-Initiated PDP Context Modification procedure to transfer the currently used PDP address to the SGSN and the MS. PDP Configuration Options contain optional PDP

parameters that the GGSN may transfer to the MS. These optional PDP parameters may be requested by the MS in the Activate PDP Context Request message, or may be sent unsolicited by the GGSN. PDP Configuration Options is sent transparently through the SGSN. The Create PDP Context messages are sent over the backbone network.

If QoS Negotiated received from the SGSN is incompatible with the PDP context being activated, the GGSN rejects the Create PDP Context Request message. The GGSN operator configures the compatible QoS profiles.

If an APN Restriction is received from the GGSN for this PDP Context, then the SGSN shall store this value for the PDP Context and the SGSN shall check this received value with the stored value for the Maximum APN Restriction to ensure there are no conflicts between values. If the consequence of this check results in the PDP context being rejected, the SGSN shall initiate a PDP Context Deactivation and return an appropriate error cause. If the PDP Context is accepted, it shall determine a (new) value for the Maximum APN Restriction. If there is no previously stored value for Maximum APN Restriction, then the Maximum APN Restriction shall be set to the value of the received APN Restriction.

- 5) In Iu mode, RAB setup is done by the RAB Assignment procedure, see subclause "RAB Assignment Procedure".
- 6) In Iu mode and if BSS trace is activated, the SGSN shall send an Invoke Trace (Trace Reference, Trace Type, Trigger Id, OMC Identity) message to the RAN. Trace Reference, and Trace Type are copied from the trace information received from the HLR or OMC.
- 7) In A/Gb mode, BSS packet flow context procedures may be executed. These procedures are defined in clause "BSS Context".
- 8) In case the QoS attributes have been downgraded in step 7 for A/Gb mode or in step 5 for Iu mode, the SGSN may inform the GGSN about the downgraded QoS attributes by sending an Update PDP Context Request to the affected GGSN. The GGSN confirms the new QoS attributes by sending an Update PDP Context Response to the SGSN.
- 9) The SGSN inserts the NSAPI along with the GGSN address in its PDP context. If the MS has requested a dynamic address, the PDP address received from the GGSN is inserted in the PDP context. The SGSN selects Radio Priority and Packet Flow Id based on QoS Negotiated, and returns an Activate PDP Context Accept (PDP Type, PDP Address, TI, QoS Negotiated, Radio Priority, Packet Flow Id, PDP Configuration Options) message to the MS. If the MS indicated in the MS Network Capability it does not support BSS packet flow procedures ~~or~~ **if the BSS does not support BSS packet flow procedures**, then the SGSN shall not include the Packet Flow Id. In A/Gb mode, the QoS Negotiated shall take into account the Aggregate BSS QoS Profile, if any, returned from the BSS. PDP Configuration Options may be used to transfer optional PDP parameters to the UE (see GSM 29.060 [26] and 24.229 [75]). PDP Configuration Options is sent transparently through the SGSN. The SGSN is now able to route PDP PDUs between the GGSN and the MS, and to start charging.

For each PDP Address a different quality of service (QoS) profile may be requested. For example, some PDP addresses may be associated with E-mail that can tolerate lengthy response times. Other applications cannot tolerate delay and demand a very high level of throughput, interactive applications being one example. These different requirements are reflected in the QoS profile. The QoS profile is defined in clause "Quality of Service Profile". If a QoS requirement is beyond the capabilities of a PLMN, the PLMN negotiates the QoS profile as close as possible to the requested QoS profile. The MS either accepts the negotiated QoS profile, or deactivates the PDP context.

After an SGSN has successfully updated the GGSN, the PDP contexts associated with an MS is distributed as shown in clause "Information Storage".

If the PDP Context Activation Procedure fails or if the SGSN returns an Activate PDP Context Reject (Cause, PDP Configuration Options) message, the MS may attempt another activation to the same APN up to a maximum number of attempts.

The CAMEL procedure calls shall be performed, see referenced procedures in 3GPP TS 23.078:

- C1) CAMEL_GPRS_PDP_Context_Establishment.

In Figure 63 and Figure 64, procedures return as result "Continue".

- C2) CAMEL_GPRS_PDP_Context_Establishment_Acknowledgement.

In Figure 63 and Figure 64, procedures return as result "Continue".

9.2.2.1.1 Secondary PDP Context Activation Procedure

The Secondary PDP Context Activation procedure may be used to activate a PDP context while reusing the PDP address and other PDP context information from an already active PDP context, but with a different QoS profile. Procedures for APN selection and PDP address negotiation are not executed. A unique TI and a unique NSAPI shall identify each PDP context sharing the same PDP address and APN.

The Secondary PDP Context Activation procedure may be executed without providing a Traffic Flow Template (TFT) to the newly activated PDP context if all other active PDP contexts for this PDP address and APN already have an associated TFT. Otherwise a TFT shall be provided. The TFT contains attributes that specify an IP header filter that is used to direct data packets received from the interconnected packet data network to the newly activated PDP context.

The Secondary PDP Context Activation procedure may only be initiated after a PDP context is already activated for the same PDP address and APN. The procedure is illustrated in Figure 65 and Figure 66.

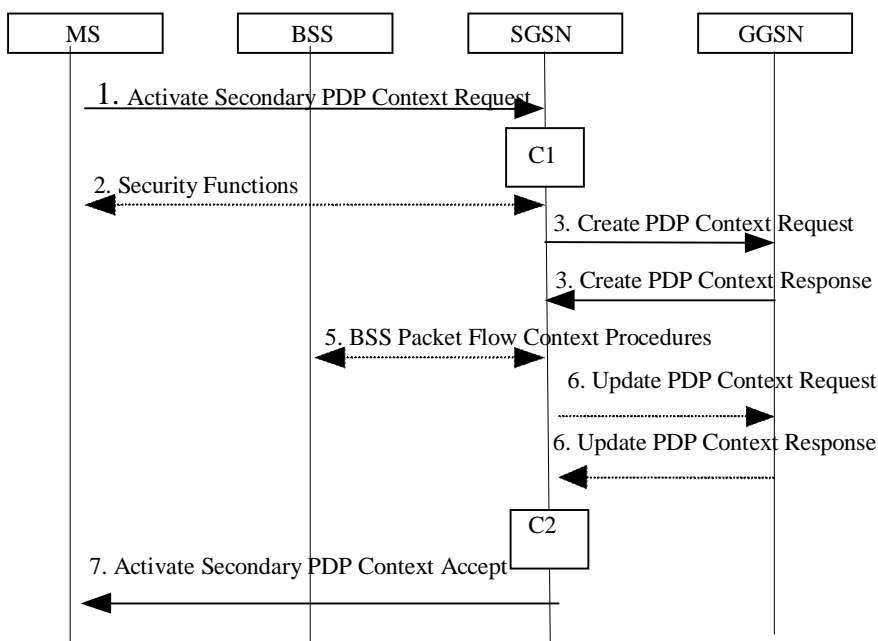


Figure 65: Secondary PDP Context Activation Procedure for A/Gb mode

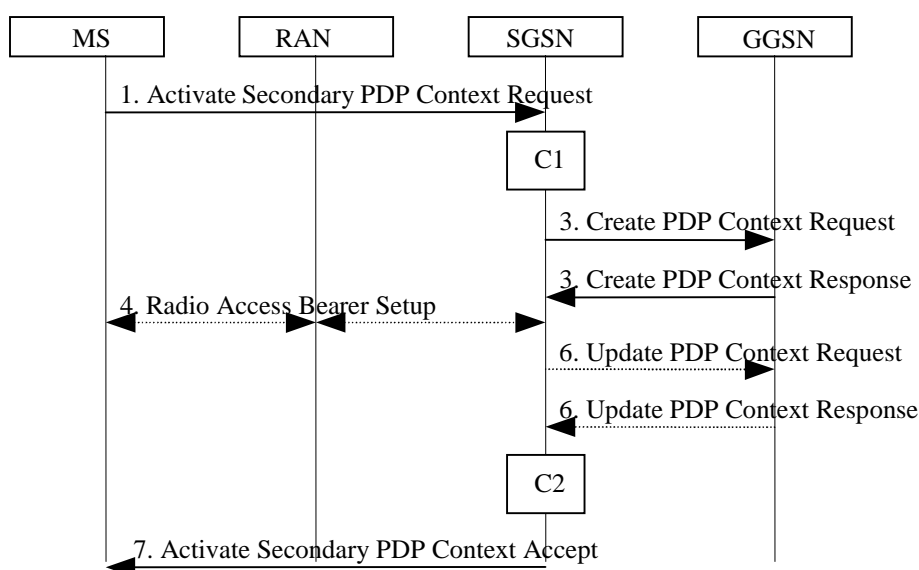


Figure 66: Secondary PDP Context Activation Procedure for Iu mode

- 1) The MS sends an Activate Secondary PDP Context Request (Linked TI, NSAPI, TI, QoS Requested, TFT, PDP Configuration Options) message to the SGSN. Linked TI indicates the TI value assigned to any one of the

already activated PDP contexts for this PDP address and APN. QoS Requested indicates the desired QoS profile. TFT is sent transparently through the SGSN to the GGSN to enable packet classification for downlink data transfer. TI and NSAPI contain values not used by any other activated PDP context. PDP Configuration Options may be used to transfer optional PDP parameters and/or requests to the GGSN (see GSM 29.060 [26] and 24.229 [75]). PDP Configuration Options is sent transparently through the SGSN.

- 2) In A/Gb mode, security functions may be executed. These procedures are defined in clause "Security Function".
- 3) The SGSN validates the Activate Secondary PDP Context Request using the TI indicated by Linked TI. The same GGSN address is used by the SGSN as for the already-activated PDP context(s) for that TI and PDP address.

The SGSN may restrict the requested QoS attributes given its capabilities and the current load, and it shall restrict the requested QoS attributes according to the subscribed QoS profile, which represents the maximum QoS per PDP context to the associated APN. The GGSN may restrict and negotiate the requested QoS as specified in clause "PDP Context Activation Procedure". The SGSN sends a Create PDP Context Request (QoS Negotiated, TEID, NSAPI, Primary NSAPI, TFT, PDP Configuration Options, serving network identity, IMEISV, CGI/SAI, RAT type, S-CDR CAMEL information) message to the affected GGSN. The SGSN shall send the serving network identity to the GGSN. Primary NSAPI indicates the NSAPI value assigned to any one of the already activated PDP contexts for this PDP address and APN. TFT is included only if received in the Activate Secondary PDP Context Request message. PDP Configuration Options is sent transparently through the SGSN if received in the Activate secondary PDP Context Request message.

The GGSN uses the same packet data network as used by the already-activated PDP context(s) for that PDP address, generates a new entry in its PDP context table, and stores the TFT. The new entry allows the GGSN to route PDP PDUs via different GTP tunnels between the SGSN and the packet data network. The GGSN returns a Create PDP Context Response (TEID, QoS Negotiated, Cause, PDP Configuration Options, Prohibit Payload Compression, APN Restriction) message to the SGSN. PDP Configuration Options may be used to transfer optional PDP parameters to the UE (see GSM 29.060 [26] and 24.229 [75]). The Prohibit Payload Compression indicates that the SGSN should negotiate no data compression for this PDP context. If an APN Restriction is received from the GGSN for this PDP Context, then the SGSN shall store this value for the PDP Context.

- 4) In Iu mode, RAB setup is done by the RAB Assignment procedure.
- 5) In A/Gb mode, BSS packet flow context procedures may be executed. These procedures are defined in clause "BSS Context".
- 6) In case the QoS attributes have been downgraded in step 5 for A/Gb mode or in step 4 for Iu mode, the SGSN may inform the GGSN about the downgraded QoS attributes by sending an Update PDP Context Request to the affected GGSN. The GGSN confirms the new QoS attributes by sending an Update PDP Context Response to the SGSN.
- 7) The SGSN selects Radio Priority and Packet Flow Id based on QoS Negotiated, and returns an Activate Secondary PDP Context Accept (TI, QoS Negotiated, Radio Priority, Packet Flow Id, PDP Configuration Options) message to the MS. If the MS indicated in the MS Network Capability it does not support BSS packet flow procedures ~~or if the BSS does not support BSS packet flow procedures~~, then the SGSN shall not include the Packet Flow Id. In A/Gb mode, the QoS Negotiated shall take into account the Aggregate BSS QoS Profile, if any, returned from the BSS. PDP Configuration Options is sent transparently through the SGSN if received in the Create PDP Context Response message. The SGSN is now able to route PDP PDUs between the GGSN and the MS via different GTP tunnels and possibly different LLC links.

For each additionally activated PDP context a QoS profile and TFT may be requested.

If the secondary PDP context activation procedure fails or if the SGSN returns an Activate Secondary PDP Context Reject (Cause, PDP Configuration Options) message, the MS may attempt another activation with a different TFT, depending on the cause.

The CAMEL procedure calls shall be performed, see referenced procedures in 3GPP TS 23.078:

- C1) CAMEL_GPRS_PDP_Context_Establishment.

In Figure 65 and in Figure 66, procedures return as result "Continue".

- C2) CAMEL_GPRS_PDP_Context_Establishment_Acknowledgement.

In Figure 65 and in Figure 66, procedures return as result "Continue".

9.2.3.1 SGSN-Initiated PDP Context Modification Procedure

The SGSN-Initiated PDP Context Modification procedure is illustrated in Figures 70a and 70b.

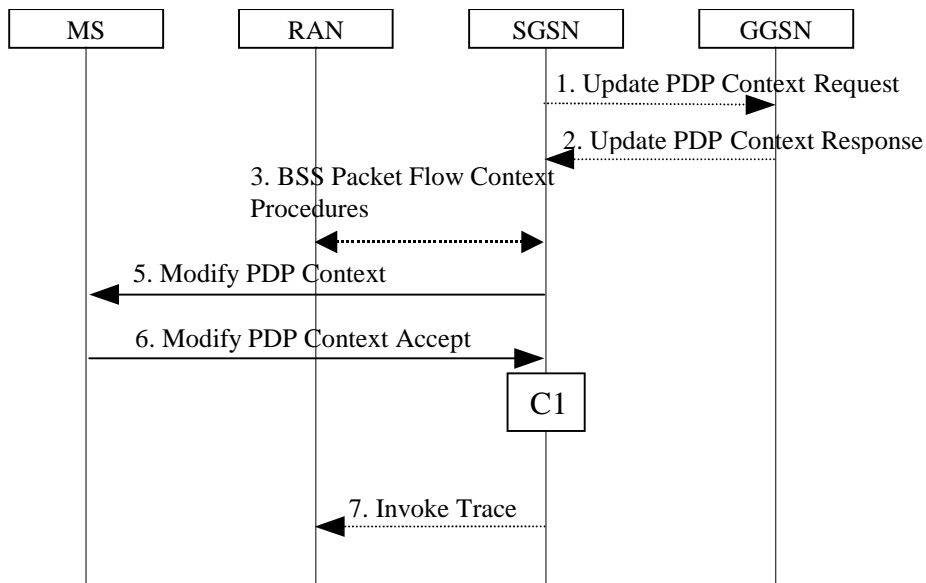


Figure 70a: SGSN-Initiated PDP Context Modification Procedure, A/Gb mode

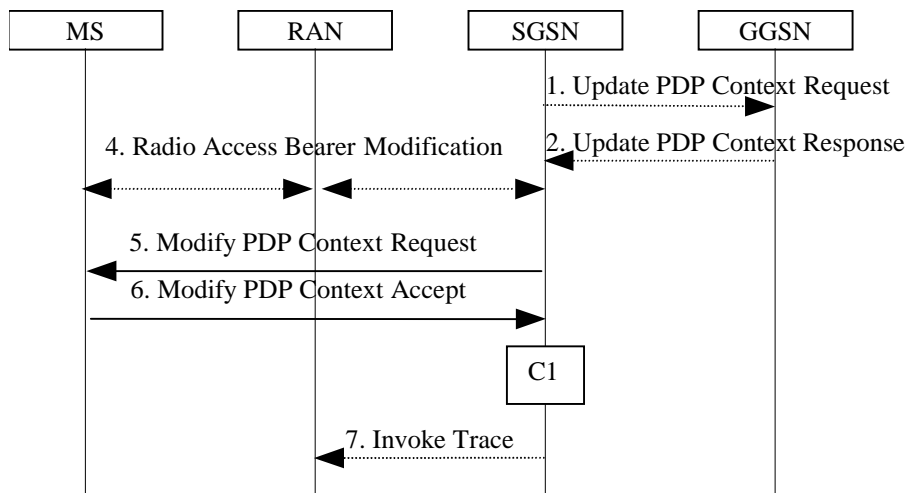


Figure 70b: SGSN-Initiated PDP Context Modification Procedure, Iu mode

- 1) The SGSN may send an Update PDP Context Request (TEID, NSAPI, QoS Negotiated, Trace Reference, Trace Type, Trigger Id, OMC Identity, serving network identity) message to the GGSN. The SGSN shall send the serving network identity to the GGSN. If QoS Negotiated received from the SGSN is incompatible with the PDP context being modified, the GGSN rejects the Update PDP Context Request. The GGSN operator configures the compatible QoS profiles. The SGSN shall include Trace Reference, Trace Type, Trigger Id, and OMC Identity in the message if GGSN trace is activated while the PDP context is active. The SGSN shall copy Trace Reference, Trace Type, and OMC Identity from the trace information received from the HLR or OMC.
- 2) The GGSN may restrict QoS Negotiated given its capabilities and the current load. The GGSN stores QoS Negotiated and returns an Update PDP Context Response (TEID, QoS Negotiated, Prohibit Payload

Compression, APN Restriction, Cause) message. The Prohibit Payload Compression indicates that the SGSN should negotiate no data compression for this PDP context.

- 3) In A/Gb mode, BSS packet flow context procedures may be executed. These procedures are defined in clause "BSS Context".
- 4) In Iu mode, radio access bearer modification may be performed by the RAB Assignment procedure.
- 5) The SGSN selects Radio Priority and Packet Flow Id based on QoS Negotiated, and may send a Modify PDP Context Request (TI, QoS Negotiated, Radio Priority, Packet Flow Id) message to the MS. If the MS indicated in the MS Network Capability it does not support BSS packet flow procedures ~~or if the BSS does not support BSS packet flow procedures~~, then the SGSN shall not include the Packet Flow Id. In A/Gb mode, the QoS Negotiated shall take into account the Aggregate BSS QoS Profile, if any, returned from the BSS.
- 6) The MS acknowledges by returning a Modify PDP Context Accept message. If the MS does not accept the new QoS Negotiated it shall instead de-activate the PDP context with the PDP Context Deactivation Initiated by the MS procedure.
- 7) If BSS trace is activated while the PDP context is active, the SGSN shall send an Invoke Trace (Trace Reference, Trace Type, Trigger Id, OMC Identity) message to the RAN. Trace Reference, and Trace Type are copied from the trace information received from the HLR or OMC.

If an APN Restriction is received from the GGSN for this PDP Context, then the SGSN shall store this value for the PDP Context, replacing any previously stored value for this PDP context. The SGSN shall determine a (new) value for the Maximum APN Restriction using any stored APN Restriction and the received APN Restriction.

The CAMEL procedure calls shall be performed, see referenced procedure in 3GPP TS 23.078:

- C1) CAMEL_GPRS_Change_Of_QoS.

The procedure returns as result "Continue".

9.2.3.2 GGSN-Initiated PDP Context Modification Procedure

The GGSN-Initiated PDP Context Modification procedure is illustrated in Figures 71a and 71b.

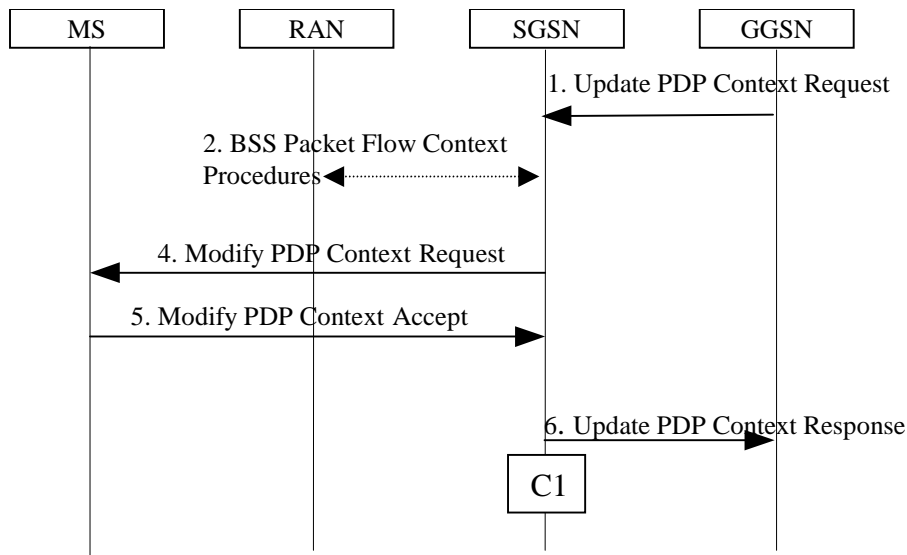


Figure 71a: GGSN-Initiated PDP Context Modification Procedure, A/Gb mode

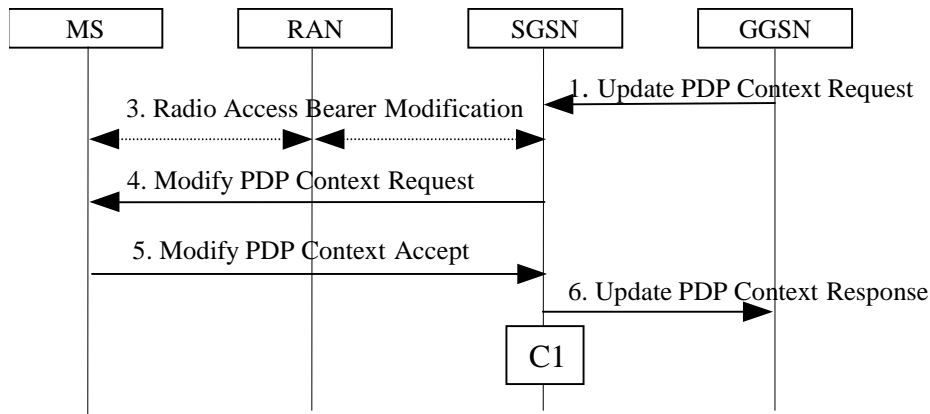


Figure 71b: GGSN-Initiated PDP Context Modification Procedure, Iu mode

- 1) The GGSN sends an Update PDP Context Request (TEID, NSAPI, PDP Address, QoS Requested, Prohibit Payload Compression, APN Restriction) message to the SGSN. QoS Requested indicates the desired QoS profile. PDP Address is optional. The Prohibit Payload Compression indicates that the SGSN should negotiate no data compression for this PDP context. The SGSN may restrict the desired QoS profile given its capabilities, the current load, the current QoS profile, and the subscribed QoS profile.
- 2) In A/Gb mode, BSS packet flow context procedures may be executed. These procedures are defined in clause "BSS Context".
- 3) In Iu mode, radio access bearer modification may be performed by the RAB Assignment procedure.
- 4) The SGSN selects Radio Priority and Packet Flow Id based on QoS Negotiated, and sends a Modify PDP Context Request (TI, PDP Address, QoS Negotiated, Radio Priority, Packet Flow Id) message to the MS. PDP Address is optional. If the MS indicated in the MS Network Capability it does not support BSS packet flow procedures ~~or if the BSS does not support BSS packet flow procedures~~, then the SGSN shall not include the Packet Flow Id. In A/Gb mode, the QoS Negotiated shall take into account the Aggregate BSS QoS Profile, if any, returned from the BSS.
- 5) The MS acknowledges by returning a Modify PDP Context Accept message. If the MS does not accept the new QoS Negotiated it shall instead de-activate the PDP context with the PDP Context Deactivation Initiated by MS procedure.
- 6) Upon receipt of the Modify PDP Context Accept message, or upon completion of the RAB modification procedure, the SGSN returns an Update PDP Context Response (TEID, QoS Negotiated) message to the GGSN. If the SGSN receives a Deactivate PDP Context Request message, it shall instead follow the PDP Context Deactivation Initiated by MS procedure.

If an APN Restriction is received from the GGSN for this PDP Context, then the SGSN shall store this value for the PDP Context, replacing any previously stored value for this PDP context. The SGSN shall determine a (new) value for the Maximum APN Restriction using any stored APN Restriction and the received APN Restriction.

The CAMEL procedure calls shall be performed, see referenced procedure in 3GPP TS 23.078:

C1) CAMEL_GPRS_Change_Of_QoS.

The procedure returns as result "Continue".

9.2.3.3 MS-Initiated PDP Context Modification Procedure

The MS-Initiated PDP Context Modification procedure is illustrated in Figures 72a and 72b.

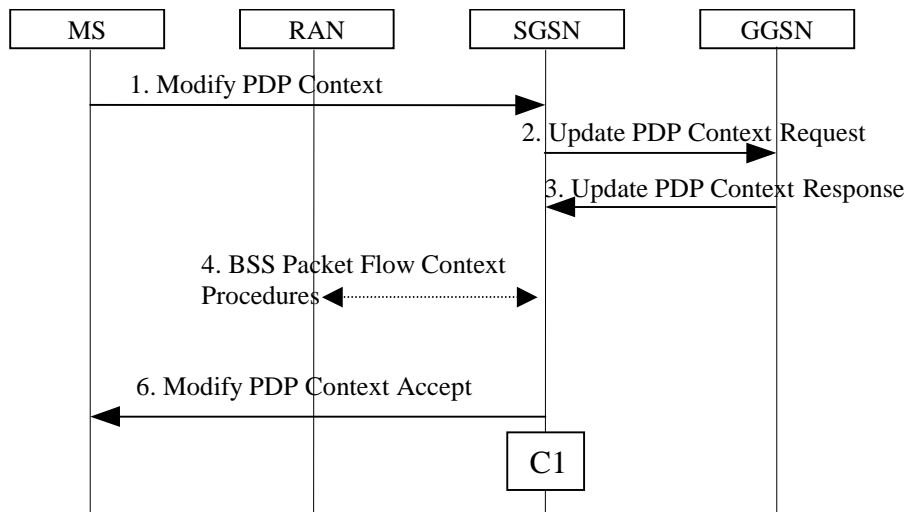


Figure 72a: MS-Initiated PDP Context Modification Procedure, A/Gb mode

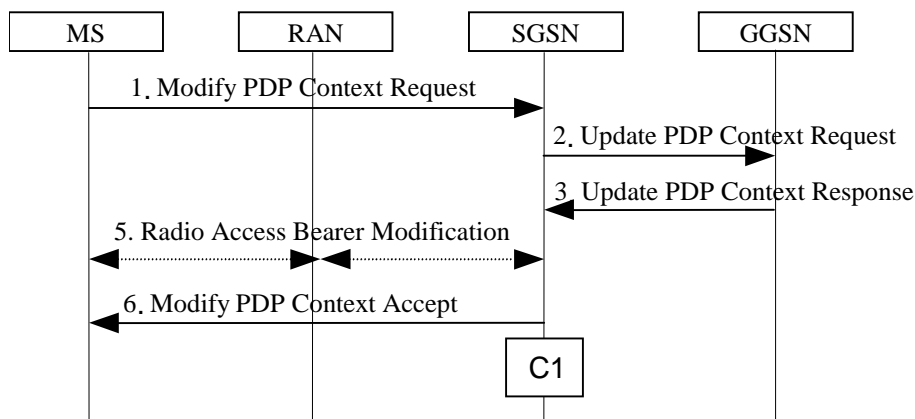


Figure 72b: MS-Initiated PDP Context Modification Procedure, Iu mode

- 1) The MS sends a Modify PDP Context Request (TI, QoS Requested, TFT, PDP Configuration Options) message to the SGSN. Either QoS Requested or TFT or both may be included. QoS Requested indicates the desired QoS profile, while TFT indicates the TFT that is to be added or modified or deleted from the PDP context. PDP Configuration Options may be used to transfer optional PDP parameters and/or requests to the GGSN.
- 2) The SGSN may restrict the desired QoS profile given its capabilities, the current load, and the subscribed QoS profile. The SGSN sends an Update PDP Context Request (TEID, NSAPI, QoS Negotiated, TFT, PDP Configuration Options, serving network identity, CGI/SAI) message to the GGSN. The SGSN shall send the serving network identity to the GGSN. If QoS Negotiated and/or TFT received from the SGSN is incompatible with the PDP context being modified (e.g., TFT contains inconsistent packet filters), the GGSN rejects the Update PDP Context Request. The GGSN operator configures the compatible QoS profile. PDP Configuration Options is sent transparently through the SGSN if received in Modify PDP Context Request message.
- 3) The GGSN may further restrict QoS Negotiated given its capabilities, operator policies and the current load. The GGSN stores QoS Negotiated, stores, modifies, or deletes TFT of that PDP context as indicated in TFT, and returns an Update PDP Context Response (TEID, QoS Negotiated, PDP Configuration Options, Prohibit Payload Compression, APN Restriction) message. PDP Configuration Options may be used to transfer optional PDP parameters to the UE. The Prohibit Payload Compression indicates that the SGSN should negotiate no data compression for this PDP context.
- 4) In A/Gb mode, BSS packet flow context procedures may be executed. These procedures are defined in clause "BSS Context".

- 5) In Iu mode, radio access bearer modification may be performed by the RAB Assignment procedure. In case the radio access bearer does not exist the RAB setup is done by the RAB Assignment procedure.
- 6) The SGSN selects Radio Priority and Packet Flow Id based on QoS Negotiated, and returns a Modify PDP Context Accept (TI, QoS Negotiated, Radio Priority, Packet Flow Id, PDP Configuration Options) message to the MS. If the MS indicated in the MS Network Capability it does not support BSS packet flow procedures ~~or if the BSS does not support BSS packet flow procedures~~, then the SGSN shall not include the Packet Flow Id. In A/Gb mode, the QoS Negotiated shall take into account the Aggregate BSS QoS Profile, if any, returned from the BSS. PDP Configuration Options is sent transparently through the SGSN if received in Modify PDP Context Response message.

NOTE1: If the SGSN does not accept QoS Requested, then steps 2 and 3 of this procedure are skipped, and the existing QoS Negotiated is returned to the MS in step 4.

NOTE2: In this release of the standards no procedure is defined that uses the Protocol Configuration Options in the PDP context modification procedure.

If an APN Restriction is received from the GGSN for this PDP Context, then the SGSN shall store this value for the PDP Context, replacing any previously stored value for this PDP context. The SGSN shall determine a (new) value for the Maximum APN Restriction using any stored APN Restriction and the received APN Restriction.

The CAMEL procedure calls shall be performed, see referenced procedure in 3GPP TS 23.078:

- C1) CAMEL_GPRS_Change_Of_QoS.

The procedure returns as result "Continue".