

**3GPP TSG CN Plenary Meeting #15
6th – 8th March 2002. Jeju, Korea.**

NP-020066

Source: TSG CN WG4
Title: CRs on Rel-5 TEI5
Agenda item: 9.14
Document for: APPROVAL

Introduction:

This document contains 8 CRs on Rel-5 Work Item "TEI5", that have been agreed by TSG CN WG4, and are forwarded to TSG CN Plenary meeting #15 for approval.

Spec	CR	Re	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
29.060	301		N4-020072	Rel-5	Priority of PDP Contexts at Inter-SGSN RA Update	B	5.0.1
23.008	038	5	N4-020196	Rel-5	Addition of multimedia information elements	B	4.1.0
29.060	291	1	N4-020244	Rel-5	Clarification on the use of the Teardown indicator IE	F	5.0.2
23.153	030	2	N4-020271	Rel-5	Codec fallback in TrFO Call Establishment to External Network	C	4.4.0
29.060	297	1	N4-020293	Rel-5	Re-define the attributions of GTP Information Element	F	5.0.1
29.060	309	1	N4-020294	Rel-5	IMS Enhancements (PCO in Secondary PDP context activation procedures)	B	5.0.1
29.060	294	1	N4-020296	Rel-5	Dangling PDP contexts handling	B	5.0.1
29.060	300	3	N4-020309	Rel-5	Generic RAN Information Procedure	B	5.0.1

3GPP TSG CN WG4 Meeting #12
Sophia Antipolis, France 26th - 30th January 2002

N4-020196

CR-Form-v5

CHANGE REQUEST

⌘ **23.008 CR CR 038** ⌘ rev **5** ⌘ Current version: **4.1.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ME/UE Radio Access Network Core Network

Title:	⌘ Addition of multimedia information elements												
Source:	⌘ CN4												
Work item code:	⌘ TEI5												
Date:	⌘ 29.1.2002												
Category:	⌘ B												
Use <u>one</u> of the following categories:													
<table border="0"> <tr> <td>F (correction)</td> <td>R96 (Release 1996)</td> </tr> <tr> <td>A (corresponds to a correction in an earlier release)</td> <td>R97 (Release 1997)</td> </tr> <tr> <td>B (addition of feature),</td> <td>R98 (Release 1998)</td> </tr> <tr> <td>C (functional modification of feature)</td> <td>R99 (Release 1999)</td> </tr> <tr> <td>D (editorial modification)</td> <td>REL-4 (Release 4)</td> </tr> <tr> <td></td> <td>REL-5 (Release 5)</td> </tr> </table>		F (correction)	R96 (Release 1996)	A (corresponds to a correction in an earlier release)	R97 (Release 1997)	B (addition of feature),	R98 (Release 1998)	C (functional modification of feature)	R99 (Release 1999)	D (editorial modification)	REL-4 (Release 4)		REL-5 (Release 5)
F (correction)	R96 (Release 1996)												
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B (addition of feature),	R98 (Release 1998)												
C (functional modification of feature)	R99 (Release 1999)												
D (editorial modification)	REL-4 (Release 4)												
	REL-5 (Release 5)												
Detailed explanations of the above categories can be found in 3GPP TR 21.900 .													

Reason for change:	⌘ New information elements have been added as a consequence of the introduction of the IP Multimedia Subsystem that affect the organization of subscriber data.
Summary of change:	⌘ The new information elements for IP Multimedia Subsystem are added.
Consequences if not approved:	⌘

Clauses affected:	⌘
Other specs affected:	⌘ <input type="checkbox"/> Other core specifications ⌘ <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications
Other comments:	⌘

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.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.

0 Scope

The present document provides details concerning information to be stored in home ~~location registers~~ [subscriber servers](#), visitor location registers ~~and~~ [GPRS Support Nodes and Call Session Control Function \(CSCF\)](#) concerning mobile subscriber.

Clause 2 contains all details concerning the definition of the parameters, often given by reference to other specifications, and where the parameter is to be stored.

Table 1 in clause 3 gives a summary overview and clause 4 identifies the reference information required for accessing the information.

0.1 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] 3GPP TR 21.905: "3G Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 22.002: "Bearer Services (BS) supported by a GSM PLMN".
- [3] 3GPP TS 22.003: "Circuit Teleservices supported by a Public Land Mobile Network (PLMN)".
- [4] 3GPP TS 22.004: "General on supplementary services".
- [5] 3GPP TS 23.003: "Numbering, addressing and identification".
- [6] 3GPP TS 23.007: "Restoration procedures".
- [7] 3GPP TS 23.009: "Handover procedures".
- [8] 3GPP TS 23.012: "Location registration procedures".
- [9] 3GPP TS 23.015: "Technical realization of operator determined barring (ODB)".
- [10] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS) Point-to-Point".
- [11] 3GPP TS 22.060: "General Packet Radio Service (GPRS); Stage 1".
- [12] 3GPP TS 23.067: "Enhanced Multi-Level Precedence and Preemption service (EMLPP) - Stage 2".
- [13] 3GPP TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) - Stage 2".
- [14] 3GPP TS 23.081: "Line identification Supplementary Services - Stage 2".
- [15] 3GPP TS 23.082: "Call Forwarding (CF) Supplementary Services - Stage 2".
- [16] 3GPP TS 23.083: "Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 2".
- [17] 3GPP TS 23.084: "Multi Party (MPTY) Supplementary Service - Stage 2".
- [18] 3GPP TS 23.085: "Closed User Group (CUG) Supplementary Service - Stage 2".

- [19] 3GPP TS 23.086: "Advice of Charge (AoC) Supplementary Service - Stage 2".
- [20] 3GPP TS 23.088: "Call Barring (CB) Supplementary Service - Stage 2".
- [21] 3GPP TS 23.060: "General Packet Radio Service (GPRS) Service Description; Stage 2".
- [22] 3GPP TS 23.078: "CAMEL, stage2".
- [23] 3GPP TS 23.090: "Unstructured Supplementary Service Data (USSD) - Stage 2".
- [24] 3GPP TS 23.116: "Super-Charger Technical Realisation; Stage 2."
- [25] 3GPP TS 23.135: "Multicall supplementary service; Stage 2"
- [26] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network Protocols - Stage 3".
- [27] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".
- [28] 3GPP TS 29.007: "General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".
- [29] 3GPP TS 29.060: "GPRS Tunnelling protocol (GTP) across the Gn and Gp interface".
- [30] 3GPP TS 42.032: "Digital cellular telecommunications system (Phase 2+); Immediate Service Termination (IST) Service Description - Stage 1".
- [31] 3GPP TS 43.020: "Digital cellular telecommunications system (Phase 2+); Security related network functions".
- [32] 3GPP TS 43.035: "Digital cellular telecommunications system (Phase 2+); Immediate Service Termination (IST) Stage 2".
- [33] 3GPP TS 43.068: "Digital cellular telecommunications system (Phase 2+); Voice Group Call Service (VGCS) - Stage 2".
- [34] 3GPP TS 43.069: "Digital cellular telecommunications system (Phase 2+); Voice Broadcast Service (VBS) - Stage 2".
- [35] GSM 03.71: "Digital cellular telecommunications system (Phase 2+); Location Services (LCS); Functional Description; Stage 2".
- [36] GSM 12.03: "Digital cellular telecommunications system (Phase 2); Security management".
- [37] GSM 12.08: "Digital cellular telecommunications system (Phase 2); Subscriber and Equipment Trace".
- [38] ITU-T Recommendation Q.763: "Specifications of Signalling System No.7; Formats and codes".
- [39] ANSI T1.113: "Signalling System No7 (SS7) Integrated Services Digital Network (ISDN) User Part"[40] 3GPP TS 32.005 "Telecommunications Management; Charging and billing; GSM call and event data for the Circuit Switched (CS) domain"
- [41] 3GPP TS 32.015 "Telecommunications Management; Charging and billing; GSM call and event data for the Packet Switched (PS) domain"
- [42] [3GPP TS 23.228: "IP Multimedia \(IM\) Subsystem - Stage 2"](#).
- [43] [3GPP TS 29.228 "IP Multimedia Subsystem Cx interface; signalling flows and message contents"](#)
- [44] [3GPP TS 29.229 "Cx Interface based on the Diameter protocol; Protocol details"](#)
- [45] [draft-ietf-sip-rfc2543bis-05: "SIP: Session Initiation Protocol", work in progress](#)
- [46] [IETF RFC 2396: "Uniform Resource Identifiers \(URI\): generic syntax"](#)

- [47] [ITU-T Recommendation E.164: "Numbering plan for the ISDN era"](#)~~IETF RFC 2806 "URLs for Telephone Calls"~~
- [48] [IETF RFC 2486: "The Network Access Identifier"](#)
- [49] [3GPP TS 33.203 "Access security for IP-based services"](#)
- [50] [3GPP TS 23.002 "Network architecture"](#)
- [51] [draft-ietf-aaa-diameter-08.txt: "Diameter Base Protocol", work in progress](#)
- [52] [3GPP TS 33.102 "Security architecture"](#)
- [53] [3GPP TS 23.218 "IP Multimedia \(IM\) call model"](#)

0.2 Abbreviations

For the purposes of the present document, the abbreviations listed in 3GPP TR 21.905 apply.

1 Introduction

1.1 Definition

The term subscriber data is used to designate all information associated with a subscription which is required for service provisions, identification, authentication, routing, call handling, GPRS mode transmission, charging, subscriber tracing, operation and maintenance purposes. Some subscriber data are referred to as permanent subscriber data, i.e. they can only be changed by administration means. Other data are temporary subscriber data which may change as a result of normal operation of the system.

Unless shown to be conditional, all data items are considered to be mandatory.

1.2 Storage facilities

This specification considers subscriber data stored in the following types of functional unit:

- [Home subscriber server \(HSS\) which contains all permanent subscriber data and all relevant temporary subscriber data to support the call control and session management entities of the different Domains and Subsystems.](#)

- \pm Home location register (HLR) which contains all permanent subscriber data and all relevant temporary subscriber data for all mobile subscribers permanently registered in the HLR [for CS and PS Domains](#).

[Note: according to 3GPP TS 23.002 \[50\] HLR is a subset of the HSS functionality.](#)

- Visitor location register (VLR) which contains all subscriber data required for call handling and other purposes for mobile subscribers currently located in the area controlled by the VLR.
- Serving GPRS Support Node (SGSN) which contains all subscriber data required for GPRS mode transmission and other purposes for mobile subscribers currently located in the area controlled by the SGSN.
- Gateway GPRS Support Node (GGSN) which contains all subscriber data required for GPRS mode transmission for mobile subscribers using any service provided by the GGSN.
- Gateway Mobile Location Center (GMLC) which contains all subscriber data required for external clients of the Location Services (LCS).

- ~~—~~In GSM, Serving Mobile Location Center (SMLC) which contains all LMU data required to manage location measurements in LMUs. (Note: a Type A LMU is a network entity that shares many of the attributes of an MS including subscription data in the HLR and identification using an IMSI).
- Serving Call Session ~~ate~~ Control Function (S-CSCF) which handles the session states in the IP Multimedia (IM) Subsystem. Further definition of the S-CSCF is provided in 3GPP 23.228 [42].

In addition, subscriber data may also be stored in the following functional unit:

- Group Call Register (GCR) which contains all data required for configuration, set-up and handling of voice group and voice broadcast calls. This encompasses subscribers identities (mobile as well as fixed network) who are nominated as dispatchers for one or several groups within the area controlled by the GCR.

NOTE: The data stored in the GCR is not strictly "subscriber data". Description of GCR data is therefore out of scope of this specification and is covered in the corresponding specifications for enhanced Multi Level Precedence and Pre-emption Service (eMLPP), Voice Group Call Service (VGCS) and Voice Broadcast Service (VBS) instead (3GPP TS 23.067, 3GPP TS 43.068 and 3GPP TS 43.069).

1.3 Subscriber data in functional units other than the HLR, the VLR, the SGSN, the GGSN, the GMLC, the SMLC and the LMU

The individual Subscriber Authentication Key Ki defined in 3GPP TS 43.020 is stored in the Authentication Centre AuC; it is also stored in the SIM and therefore available in the MS. Version numbers of algorithms A3 and A8 may also be stored in the AuC.

NOTE: It is for further study whether or not other types of functional units containing mobile subscriber parameters are to be included in this specification. Such units could include encryption key distribution centres, maintenance centres, etc.

2 Definition of subscriber data for CS and PS domain

End of Modification

3. Definition of subscriber data for IP Multimedia services domain

3.1 Data related to subscription, identification and numbering

3.1.1 Private User Identity

The Private User Identity is in the form of a Network Access Identifier (NAI), which is defined in RFC 2486 [48].

The Private User Identity is permanent subscriber data and is stored in HSS and in S-CSCF.

3.1.2 Public Identities

The Public Identities contains one or several instances of Public Identity, each of which can be either in a form of a SIP URL (with the format defined in draft-ietf-sip-rfc2543bis-05 [45] and RFC 2396 [46]) or ~~a TEL-URL (with the format defined in [47])~~an E.164 number [47].

The Public Identities is permanent subscriber data and is stored in HSS and in S-CSCF.

3.2 Data related to registration

3.2.1 Registration Status

The Registration Status, specified in 3GPP TS 29.228 [43], contains the status of registration of a multimedia user (e.g. registered, not registered, temporarily registered waiting for authentication).

The Registration Status is temporary subscriber data and is stored in HSS.

3.2.2 S-CSCF Name

The S-CSCF Name identifies the S-CSCF allocated to the subscriber when the subscriber is registered to IP Multimedia Services. It is used during mobile terminated sessions set-up and re-registrations. The S-CSCF Name shall be in the form of a SIP URL as defined in draft-ietf-sip-rfc2543bis-05 [45] and RFC 2396 [46].

The S-CSCF Name is temporary data and is stored in HSS.

~~Note: the S-CSCF Name is also used in the I-CSCF in the mobile terminated session setup and in the re-registration.~~

3.2.3 Diameter Client Address of S-CSCF

The Diameter Client Address of the S-CSCF identifies the Diameter client in the S-CSCF when the subscriber is registered to IP Multimedia Services. It is used ~~when the subscriber profile is updated from the HSS~~ in requests sent by the HSS to the S-CSCF. The format of the Diameter Client Address is the Diameter Identity defined in draft-ietf-aaa-diameter-08 [51] ~~3GPP TS 23.002 [50].~~

The Diameter Client Address of the S-CSCF is temporary data and is stored in HSS.

3.2.34 Diameter Server Address of HSS

The Diameter Server Address of the HSS identifies the Diameter Server in the HSS when the subscriber is registered to IP Multimedia Services. It is used ~~when e.g. new security parameters are requested from HSS by the S-CSCF~~ in requests send by the S-CSCF to the HSS. The format of the Diameter Server Address is the Diameter Identity defined in draft-ietf-aaa-diameter-08 [51].

The Diameter Server Address of the HSS is temporary data and is stored in S-CSCF.

Data related to roaming

3.3.1 Roaming Allowed

~~The Roaming Allowed parameter shall be in the form of a Boolean flag and shall indicate whether the subscriber is allowed to use IP Multimedia service when roaming outside the home domain, and depending on the visited domain where the user is roaming.~~

~~The Roaming Allowed parameter shall be permanent data in the HSS.~~

3.43 Data related to authentication and ciphering

3.43.1 Random Challenge (RAND), Expected Response (XRES), Cipher Key (CK), Integrity Key (IK) and Authentication Token (AUTN)

For contents of Random Challenge (RAND), Expected Response (XRES), Cipher Key (CK), Integrity Key (IK) and Authentication Token (AUTN) see subclause 2.3.2.

A set of quintuplet vectors are calculated in the HSS, and sent from the HSS to the S-CSCF (see 3GPP TS 29.228 [43]).

These data are temporary subscriber data conditionally stored in the HSS and in the S-CSCF.

3.54 Data related S-CSCF selection information

3.54.1 Server Capabilities

The Server Capabilities contains information to assist the Interrogating-CSCF in the selection of a S-CSCF. For definition and handling of the data see 3GPP TS 29.228 [43] and 3GPP TS 29.229 [44].

The Server Capabilities information is permanent data and is stored in HSS.

Note: the Server Capabilities is also used in the I-CSCF in the initial registration.

3.65 Data related to Application and service triggers

For definition and handling of these data see 3GPP TS 23.9.218 [53].

3.65.1 Subscribed Media

The Subscribed Media shall provide a list of media types that the subscriber is authorized to request. This shall include SDP Media Types, Transport Protocols, Media Format and Bandwidth. The format of the list and the parameters contained within is FFS.

The Subscribed Media is permanent data stored in the HSS and in the S-CSCF.

3.65.2 ServiceInitial Filter Criteria

FFS

3.65.3 Application Server Addresses

FFS

3.76 Data related to Core Network Services Authorization

This is FFS.

34 Summary of data stored in location registers

Table 1 gives an overview of data stored in location registers for non-GPRS Network Access Mode (CS), whereas table 2 shows the data stored in the location registers, in the SGSN and in the GGSN for GPRS Network Access Mode. [Table 3 gives an overview of data stored for IP Multimedia services.](#) In the tables, M = mandatory means that this parameter is stored for all subscribers with subscription of the Network Access Mode as shown in the table heading and defining the table; and C = conditional means that the parameter is subject to some condition (e.g. subscription of teleservice or other services, reception of optional message or short-lived data). The type indication indicates whether the subscriber data is temporary (T) or permanent (P) data, where permanent data can be set and modified but by the operator, whereas the temporary data are set and changed automatically by network functions.

45 Accessing subscriber data

It shall be possible to retrieve or store subscriber data concerning a specific MS from the ~~HLR~~HSS by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);
- Mobile Station ISDN Number (MSISDN).

It shall be possible to retrieve or store subscriber IP Multimedia service data concerning a specific MS from the HSS by use of each of the following references:

- Private User Identity
- Public Identity

It shall be possible to retrieve or store subscriber data concerning a specific MS from the VLR by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);
- Temporary Mobile Subscriber Identity (TMSI).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the SGSN by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);
- Packet Temporary Mobile Subscriber identity (P-TMSI).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the GGSN by use of the following reference:

- ~~_____~~International Mobile Subscriber Identity (IMSI).

See clause ~~3-4~~ for explanation of M, C, T and P in table 1, ~~and~~ table 2 and table 3.

5.1 Non-GPRS Network Access Mode Data Storage

Table 1: Overview of data stored for non-GPRS Network Access Mode (CS)

PARAMETER	SUBCLAUSE	HLR	VLR	TYPE
IMSI	2.1.1.1	M	M	P
Network Access Mode	2.1.1.2	M	-	P
International MS ISDN number	2.1.2	M	M	P
Multinumbering MSISDNs	2.1.3	C	-	P
Basic MSISDN indicator	2.1.3.1	C	-	P
MSISDN-Alert indicator	2.1.3.2	C	-	P
TMSI	2.1.4	-	C	T
LMSI	2.1.8	C	C	T
Mobile Station Category	2.2.1	M	M	P
LMU Identifier	2.2.2	C	C	P
RAND, SRES and Kc	2.3.1	-	C	T
RAND, XRES, CK, IK and AUTN	2.3.2	M	C	T
Ciphering Key Sequence Number	2.3.3	-	M	T
Key Set Identifier (KSI)	2.3.4	-	M	T
MSRN	2.4.1	-	C	T
Location Area Identity	2.4.2	-	M	T
VLR number	2.4.5	M	-	T
MSC number	2.4.6	M	C	T
HLR number	2.4.7	-	C	T
Subscription restriction	2.4.10	C	-	P
RSZI lists	2.4.11.1	C	-	P
Zone Code List	2.4.11.2	-	C	P
MSC area restricted flag	2.4.12	M	-	T
LA not allowed flag	2.4.13	-	M	T
ODB-induced barring data	2.4.15.1	C	-	T
Roaming restriction due to unsupported feature	2.4.15.2	M	M	T
Cell Global ID or Service Area ID	2.4.16	-	C	T
LSA Identity	2.4.17.1	C	C	P
LSA Priority	2.4.17.2	C	C	P
LSA Preferential Access Indicator	2.4.17.2A	C	C	P
LSA Active Mode Support Indicator	2.4.17.2B	C	C	P
LSA Only Access Indicator	2.4.17.3	C	C	P
LSA Active Mode Indicator	2.4.17.4	C	C	P
VPLMN Identifier	2.4.17.5	C	-	P
Provision of bearer service	2.5.1	M	M	P
Provision of teleservice	2.5.2	M	M	P
BC allocation	2.5.3	C	C	P
IMSI detached flag	2.7.1	-	C	T
Confirmed by Radio Contact indicator	2.7.4.1	-	M	T
Subscriber Data Confirmed by HLR indicator	2.7.4.2	-	M	T
Location Information Confirmed in HLR indicator	2.7.4.3	-	M	T
Check SS indicator	2.7.4.4	M	-	T
MS purged for non-GPRS flag	2.7.5	M	-	T
MNRR	2.7.7	C	-	T
Subscriber status	2.8.1	C	C	P
Barring of outgoing calls	2.8.2.1	C	C	P
Barring of incoming calls	2.8.2.2	C	-	P
Barring of roaming	2.8.2.3	C	-	P
Barring of premium rate calls	2.8.2.4	C	C	P
Barring of supplementary service management	2.8.2.5	C	C	P
Barring of registration of call forwarding	2.8.2.6	C	-	P
Barring of invocation of call transfer	2.8.2.7	C	C	P
Operator determined barring PLMN-specific data	2.8.3	C	C	P
Notification to CSE flag for ODB	2.8.4	C	-	T
gsmSCF address list for ODB	2.8.5	C	-	P
Handover Number	2.9.1	-	C	T
Messages Waiting Data	2.10.1	C	-	T
Mobile Station Not Reachable Flag	2.10.2	C	M	T
Memory Capacity Exceeded Flag	2.10.3	C	-	T
Trace Reference	2.11.1	C	C	P
Trace Type	2.11.2	C	C	P
Operations Systems Identity	2.11.3	C	C	P

PARAMETER	SUBCLAUSE	HLR	VLR	TYPE
HLR Trace Type	2.11.4	C	-	P
MAP Error On Trace	2.11.5	C	-	T
Trace Activated in VLR	2.11.6	C	C	T
Foreign Subscriber Registered in VLR	2.11.7	-	C	P
VGCS Group Membership List	2.12.1	C	C	P
VBS Group Membership List	2.12.2	C	C	P
Broadcast Call Initiation Allowed List	2.12.2.1	C	C	P
Originating CAMEL Subscription Information (O-CSI)	2.14.1.1/3.1	C	C	P
Terminating CAMEL Subscription Information (T-CSI)	2.14.1.2	C	-	P
VMSC Terminating CAMEL Subscription Information (VT-CSI)	2.14.1.2/3.2	C	C	P
Location Information/Subscriber state Information	2.14.1.3	C	-	P
USSD CAMEL subscription information(U-CSI)	2.14.1.4	C	-	P
SS invocation notification (SS-CSI)	2.14.1.5/3.2	C	C	P
Translation information flag(TIF-CSI)	2.14.1.6/3.6	C	C	P
Dialled service CAMEL Subscription Information (D-CSI)	2.14.1.10/3.6	C	C	P
USSD General CAMEL service information (UG-CSI)	2.14.2	C	-	P
O-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		T
SS-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		T
VT-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		T
Short Message Service CAMEL Subscription Information(SMS-CSI)	Error!	C	C	P
	Reference source not found./Error!			
	Reference source not found.			
SMS-CSI VLR Negotiated CAMEL Capability Handling	2.14.2.1	C		T
M-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		T
VLR Supported CAMEL Phases	2.14.2.3	C		T
GsmSCF address for CSI	2.14.2.4	C		P
IST Alert Timer	2.15.1	C	C	P
Privacy Exception List	2.16.1.1	C	C	P
GMLC Numbers	2.16.1.2	C	C	P
MO-LR List	2.16.1.3	C	C	P
Age Indicator	2.17.1	C	C	T
CS Allocation/Retention priority	2.18.1	C	C	P

5.2 GPRS Network Access Mode Storage

Table 2: Overview of data used for GPRS Network Access Mode

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE
IMSI	2.1.1.1	M	M	M	M	P
Network Access Mode	2.1.1.2	M	-	C note1	-	P
International MS ISDN number	2.1.2	M	M	M	-	T
multinumbeing MSISDNs	2.1.3	C	-	-	-	T
Basic MSISDN indicator	2.1.3.1	C	-	-	-	T
MSISDN-Alert indicator	2.1.3.2	C	-	-	-	T
P-TMSI	2.1.5	-	-	C	-	T
TLLI	2.1.6	-	-	C	-	T
Random TLLI	2.1.7	-	-	C	-	T
IMEI	2.1.9	-	-	C	-	T
RAND/SRES and Kc	2.3.1	-	-	C	-	T
RAND, XRES, CK, IK, AUTN	2.3.2	M	-	C	-	T
Ciphering Key Sequence Number	2.3.3	-	-	M	-	T
Key Set Identifier (KSI)	2.3.4	-	-	M	-	T
Selected Ciphering Algorithm	2.3.5	-	-	M	-	T
Current Kc	2.3.6	-	-	M	-	T
P-TMSI Signature	2.3.7	-	-	C	-	T
Routing Area Identity	2.4.3	-	-	M	-	T
VLR Number	2.4.5	M	-	C note2	-	T
SGSN Number	2.4.8.1	M	C note2	-	-	T
GGSN Number	2.4.8.2	M	-	-	-	P
RSZI Lists	2.4.11.1	C	-	-	-	P
Zone Code List	2.4.11.2	-	-	C	-	P
LA not allowed flag	2.4.13	-	-	M	-	T
SGSN area restricted flag	2.4.14	M	-	-	-	T
Roaming Restriction in the SGSN ..	2.4.15.2	M	-	M	-	T
Cell Global ID or Service Area ID	2.4.16	-	-	C	-	T
LSA Identity	2.4.17.1	C	C	C	-	P
LSA Priority	2.4.17.2	C	C	C	-	P
LSA Preferential Access Indicator	2.4.17.2A	C	C	C	-	P
LSA Active Mode Support Indicator	2.4.17.2B	C	C	C	-	P
LSA Only Access Indicator	2.4.17.3	C	C	C	-	P
LSA Active Mode Indicator	2.4.17.4	C	C	C	-	P
VPLMN Identifier	2.4.17.5	C	-	-	-	P
Provision of teleservice	2.5.2	C	-	C	-	P
Transfer of SM option	2.5.4	M	-	-	-	P
MNRG	2.7.2	M	-	M	M	T
MM State	2.7.3	-	-	M	-	T
Subscriber Data Confirmed by HLR Indicator	2.7.4.2	-	-	M	-	T
Location Info Confirmed by HLR Indicator	2.7.4.3	-	-	M	-	T
MS purged for GPRS flag	2.7.6	M	-	-	-	T
MNRR	2.7.7	C	-	-	-	T
Subscriber Status	2.8.1	C	-	C	-	P
Barring of outgoing calls	2.8.2.1	C	-	-	-	P
Barring of roaming	2.8.2.3	C	-	C	-	P
Barring of Packet Oriented Services	2.8.2.8	C	-	C	-	P
ODB PLMN-specific data	2.8.3	C	-	C	-	P
Notification to CSE flag for ODB	2.8.4	C	-	-	-	T
gsmSCF address list for ODB	2.8.5	C	-	-	-	P
Trace Activated in SGSN	2.11.7	C	-	C	-	P
PDP Type	2.13.1	C	-	C	M	P
PDP Address	2.13.2	C	-	C	M	P
NSAPI	2.13.3	-	-	C	C	T
PDP State	2.13.4	-	-	C	-	T
New SGSN Address	2.13.5	-	-	C	-	T
Access Point Name	2.13.6	C	-	C	C	P/T
GGSN Address in Use	2.13.7	-	-	C	-	T
VPLMN Address Allowed	2.13.8	C	-	C	-	P
Dynamic Address	2.13.9	-	-	-	C	T
SGSN Address	2.13.10	-	-	-	M	T
GGSN-list	2.13.11	M	-	-	-	T
Quality of Service Subscribed	2.13.12	C	-	C	-	P

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE
Quality of Service Requested	2.13.13	-	-	C	-	T
Quality of Service Negotiated	2.13.14	-	-	C	M	T
SND	2.13.15	-	-	C	C	T
SNU	2.13.16	-	-	C	C	T
DRX Parameters	2.13.17	-	-	M	-	T
Compression	2.13.18	-	-	C	-	T
NGAF	2.13.19	-	-	C note2	-	T
Classmark	2.13.20	-	-	M	-	T
TID	2.13.21	-	-	C	C	T
Radio Priority	2.13.22	-	-	C	-	T
Radio Priority SMS	2.13.23	-	-	C	-	T
PDP Context Identifier	2.13.24	C	-	C	-	T
PDP Context Charging Characteristics	2.13.25	C	-	C	C	P
Short Message Service CAMEL Subscription Information (SMS-CSI)	2.14.4.1/1.8	C	-	C	-	P
GPRS CAMEL Subscription Information (GPRS-CSI)	2.14.4.2/1.9	C	-	C	-	C
SMS-CSI SGSN Negotiated CAMEL Capability Handling	2.14.2.1	C	-	-	-	T
GPRS-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C	-	-	-	T
SGSN Supported CAMEL Phases	2.14.2.3	C	-	-	-	T
GsmSCF address for CSI	2.14.2.4	C	-	-	-	P
Age Indicator	2.16.1	C	-	C	-	T
Subscribed Charging Characteristics	2.19.1	C	-	C	C	P
Privacy Exception List	2.16.1.1	C	-	C	-	P
GMLC Numbers	2.16.1.2	C	-	C	-	P
MO-LR List	2.16.1.3	C	-	C	-	P

The HLR column indicates only GPRS related use, i.e. if the HLR uses a parameter in non-GPRS Network Access Mode but not in GPRS Network Access Mode, it is not mentioned in this table 2.

Note 1: This parameter is relevant in the SGSN only when the Gs interface is installed.

Note 2: The VLR column is applicable if Gs interface is installed. It only indicates GPRS related data to be stored and is only relevant to GPRS subscribers registered in VLR.

For special condition of storage see in clause 2. See clause 3 for explanation of M, C, T and P in table 2.

5.3 IP Multimedia Service Data Storage

Table 3: Overview of data used for IP Multimedia services

PARAMETER	Subclause	HSS	S-CSCF	TYPE
Private User Identity	3.1.1	M	M	P
Public Identity	3.1.2	M	M	P
Registration Status	3.2.1	M	-	T
S-CSCF Name	3.2.2	M	-	T
Diameter Client Address of S-CSCF	3.2.3	M	-	T
Diameter Server Address of HSS	3.2.3	-	M	T
Roaming Allowed				P
RAND, XRES, CK, IK and AUTN	3.3.1	M	C	T
Server Capabilities	3.4.1	C	C	P
Subscribed Media	3.5.1	FFS	FFS	P
Initial Filter Criteria	3.5.2	C	C	P
Application Server Address	3.5.3	C	C	P

Annex A (informative): Change history

Change history						
TSG CN#	Spec	Version	CR	<Phase>	New Version	Subject/Comment
Apr 1999	GSM 03.08	7.0.0				Transferred to 3GPP CN1
CN#03	23.008			R99	3.0.0	Approved at CN#03
CN#05	23.008	3.0.0	002r1	R99	3.1.0	Approved at CN#05
CN#06	23.008	3.1.0	003r1	R99	3.2.0	Introduction of the Super-Charger Concept in TS 23.008
CN#06	23.008	3.1.0	004r3	R99	3.2.0	Authentication Enhancements
CN#06	23.008	3.1.0	009	R99	3.2.0	Authentication Enhancements
CN#06	23.008	3.1.0	010r2	R99	3.2.0	Combined CR on 23.008
CN#06	23.008	3.1.0	011	R99	3.2.0	Organization of Subscriber Data for LCS
CN#07	23.008	3.2.0	012r2	R99	3.3.0	Introduction of 'Notification to CSE flag' to the operator determined barring data
CN#07	23.008	3.2.0	013	R99	3.3.0	Correction of LSA Information
CN#07	23.008	3.2.0	014r2	R99	3.3.0	The addition of priority information to subscriber data
CN#07	23.008	3.2.0	015r1	R99	3.3.0	Introduction of Multicall
CN#07	23.008	3.2.0	016r1	R99	3.3.0	Parallel handling of multiple PDP contexts
CN#07	23.008	3.2.0	019r1	R99	3.3.0	Introduction of Service Area Identification
CN#07	23.008	3.2.0	020r1	R99	3.3.0	Addition of gsmSCF address list to CSI
CN#07	23.008	3.2.0	023r1	R99	3.3.0	Combined CR on 23.008
CN#07	23.008	3.2.0	024	R99	3.3.0	Adding D-CSI to table with Negotiated CAMEL Capability Handling variables
CN#07	23.008	3.2.0	025	R99	3.3.0	Addition of PDP Context Identifier
CN#08	23.008	3.3.0	017	R99	3.4.0	Addition of subscribed charging characteristics information
CN#08	23.008	3.3.0	026r2	R99	3.4.0	Editorial changes on 23.008 draft version 3.2.0
CN#08	23.008	3.3.0	027	R99	3.4.0	Clarifications on GSM vs. UMTS specific parts
CN#08	23.008	3.3.0	029	R99	3.4.0	Addition of charging characteristics per PDP context
CN#09	23.008	3.4.0	030	R99	3.5.0	Deletion of "Barring of roaming" stored in SGSN
CN#09	23.008	3.4.0	031	R99	3.5.0	Corrections of the description of BC allocation for VLR (Release 99)
CN#11	23.008	3.5.0		Rel-4	4.0.0	Version updated from R99 to Rel-4 after CN#11
CN#11	23.008	3.5.0	032r1	Rel-4	4.0.0	Declare barring data for ODB PS
CN#11	23.008	3.5.0	033r2	Rel-4	4.0.0	Addition of LCS related subscriber data for PS domain
CN#12	23.008	4.0.0	035r3	Rel-4	4.1.0	Correction of references
CN#12	23.008	4.0.0	037	Rel-4	4.1.0	Supported CAMEL Phases in VLR is temporary
	23.008	4.1.0		Rel-5	5.0.0	Version updated from Rel-4 to Rel-5 after CN#11

CHANGE REQUEST

⌘ **29.060 CR 309** ⌘ rev **1** ⌘ Current version: **5.0.1** ⌘

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

Proposed change affects: ⌘ (U)SIM ME/UE Radio Access Network Core Network

Title: ⌘ IMS Enhancements (PCO in Secondary PDP context activation procedures)

Source: ⌘ CN4

Work item code: ⌘ TEI5

Date: ⌘ 13.02.2002

Category: ⌘ **B**

Release: ⌘ REL-5

Use one of the following categories:

Use one of the following releases:

F (correction)

2 (GSM Phase 2)

A (corresponds to a correction in an earlier release)

R96 (Release 1996)

B (addition of feature),

R97 (Release 1997)

C (functional modification of feature)

R98 (Release 1998)

D (editorial modification)

R99 (Release 1999)

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

REL-4 (Release 4)

REL-5 (Release 5)

Reason for change: ⌘ Application related information has to be carried between the UE and the GGSN transparently through the SGSN.

For the purpose of IMS, SA2 has detected the need to pass at least following application level information between UE and GGSN

1. "Request for the address of the P-CSCF" that is sent from UE to GGSN and the corresponding answer that is sent back from GGSN to UE.
2. "Media binding information" allowing GGSN to associate a PDP context with the policy decision received on Go.
3. "Application level signalling flag" allows the UE to indicate to the network the intention of using the PDP context for application level signalling.

During CN1#22 the following was agreed:

1. PCO IE will be used primary PDP context activation and secondary PDP context activation procedures from Rel-5 onwards. PCO will contain P-CSCF flag /addresses and Application level signalling flag.
2. TFT IE is used to carry Authorization token in PDP context modification procedure from Rel-5 onwards.

Summary of change: ⌘ This contribution proposes the usage of Protocol Configuration Options IE at secondary PDP context activation.

Consequences if not approved: ⌘ IMS will not work in Rel-5.

Clauses affected:	⌘										
Other specs affected:	⌘	<table border="1"> <tr> <td><input checked="" type="checkbox"/></td> <td>Other core specifications</td> <td>⌘ 24.008-556, 23.060-308, 23.207-???</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Test specifications</td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td>O&M Specifications</td> <td></td> </tr> </table>	<input checked="" type="checkbox"/>	Other core specifications	⌘ 24.008-556, 23.060-308, 23.207-???	<input type="checkbox"/>	Test specifications		<input type="checkbox"/>	O&M Specifications	
<input checked="" type="checkbox"/>	Other core specifications	⌘ 24.008-556, 23.060-308, 23.207-???									
<input type="checkbox"/>	Test specifications										
<input type="checkbox"/>	O&M Specifications										
Other comments:	⌘										

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.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.

7.3 Tunnel Management Messages

7.3.1 Create PDP Context Request

A Create PDP Context Request shall be sent from a SGSN node to a GGSN node as a part of the GPRS PDP Context Activation procedure. After sending the Create PDP Context Request message, the SGSN marks the PDP context as 'waiting for response'. In this state the SGSN shall accept G-PDUs from the GGSN but shall not send these G-PDUs to the MS. A valid request initiates the creation of a tunnel between a PDP Context in a SGSN and a PDP Context in a GGSN. If the procedure is not successfully completed, the SGSN repeats the Create PDP Context Request message to the next GGSN address in the list of IP addresses, if there is one. If the list is exhausted the activation procedure fails.

The Tunnel Endpoint Identifier Data I field specifies a downlink Tunnel Endpoint Identifier for G-PDUs which is chosen by the SGSN. The GGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent downlink G-PDUs which are related to the requested PDP context.

The Tunnel Endpoint Identifier Control Plane field specifies a downlink Tunnel Endpoint Identifier for control plane messages which is chosen by the SGSN. The GGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent downlink control plane messages which are related to the requested PDP context. If the SGSN has already confirmed successful assignment of its Tunnel Endpoint Identifier Control Plane to the peer GGSN, this field shall not be present. The SGSN confirms successful assignment of its Tunnel Endpoint Identifier Control Plane to the GGSN when it receives any message with its assigned Tunnel Endpoint Identifier Control Plane in the GTP header from the GGSN.

The MSISDN of the MS is passed to the GGSN inside the Create PDP Context Request; This additional information can be used when a secure access to a remote application residing on a server is needed. The GGSN would be in fact able to provide the user identity (i. e. the MSISDN) to the remote application server, providing it with the level of trust granted to users through successfully performing the GPRS authentication procedures, without having to re-authenticate the user at the application level.

If the MS requests a dynamic PDP address and a dynamic PDP address is allowed, then the PDP Address field in the End User Address information element shall be empty. If the MS requests a static PDP Address then the PDP Address field in the End User Address information element shall contain the static PDP Address. In case the PDP addresses carried in the End User Address and optionally in the Protocol Configuration Option information element contain contradicting information, the PDP address carried in the End User Address information element takes the higher precedence. The Quality of Service Profile information element shall be the QoS values to be negotiated between the MS and the SGSN at PDP Context activation.

The SGSN shall include an SGSN Address for control plane and an SGSN address for user traffic, which may differ from that provided by the underlying network service (e.g. IP). The GGSN shall store these SGSN Addresses and use them when sending control plane on this GTP tunnel or G-PDUs to the SGSN for the MS.

The SGSN shall include a Recovery information element into the Create PDP Context Request if the SGSN is in contact with the GGSN for the very first time or if the SGSN has restarted recently and the new Restart Counter value has not yet been indicated to the GGSN. The GGSN that receives a Recovery information element in the Create PDP Context Request message element shall handle it in the same way as when receiving an Echo Response message. The Create PDP Context Request message shall be considered as a valid activation request for the PDP context included in the message.

The SGSN shall include either the MS provided APN, a subscribed APN or an SGSN selected APN in the message; the Access Point Name may be used by the GGSN to differentiate accesses to different external networks. The Selection Mode information element shall indicate the origin of the APN in the message.

For contexts created by the Secondary PDP Context Activation Procedure the SGSN shall include the linked NSAPI. Linked NSAPI indicates the NSAPI assigned to any one of the already activated PDP contexts for this 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. TFT is used for packet filtering in the GGSN.

When using the Secondary PDP Context Activation Procedure, the Selection mode, IMSI, MSISDN, End User Address and Access Point Name and Protocol Configuration Options information elements shall not be included in the message.

The Protocol Configuration Options information element is applicable for the PDP type IP only. The Protocol Configuration Options (PCO) information element may be included in the request when the MS provides the GGSN with application specific parameters. The SGSN includes this IE in the Create PDP Context Request if the associated Activate PDP Context Request from the MS includes protocol configuration options. The SGSN shall copy the content of this IE transparently from the content of the PCO IE in the Activate PDP Context Request message.

NEXT MODIFICATION

7.3.2 Create PDP Context Response

The message shall be sent from a GGSN node to a SGSN node as a response of a Create PDP Context Request. When the SGSN receives a Create PDP Context Response with the Cause value indicating 'Request Accepted', the SGSN activates the PDP context and may start to forward T-PDUs to/from the MS from/to the external data network.

The Cause value indicates if a PDP context has been created in the GGSN or not. A PDP context has not been created in the GGSN if the Cause differs from 'Request accepted'. Possible Cause values are:

- "Request Accepted".
- "No resources available".
- "All dynamic PDP addresses are occupied".
- "No memory is available".
- "Missing or unknown APN".
- "Unknown PDP address or PDP type".
- "User authentication failed".
- "System failure".
- "Semantic error in the TFT operation".
- "Syntactic error in the TFT operation".
- "Semantic errors in packet filter(s)".
- "Syntactic errors in packet filters(s)".
- "Mandatory IE incorrect".
- "Mandatory IE missing".
- "Optional IE incorrect".
- "Invalid message format".

'No resources available' indicates e.g. that all dynamic PDP addresses are occupied or no memory is available. 'Missing or unknown APN' indicates e.g. when the GGSN does not support the Access Point Name. 'Unknown PDP address or PDP type' indicates e.g. when the GGSN does not support the PDP type or the PDP address.

'User authentication failed' indicates that the external packet network has rejected the service requested by the user.

Only the Cause information element, optionally Protocol Configuration Options₂, and optionally the Recovery information element shall be included in the response if the Cause contains another value than 'Request accepted'.

All information elements, except Recovery, Protocol Configuration Options, Charging Gateway Address, Tunnel Endpoint Identifier Control Plane₂, and Private Extension, are mandatory if the Cause contains the value 'Request accepted'.

The Tunnel Endpoint Identifier for Data (I) field specifies an uplink Tunnel Endpoint Identifier for G-PDUs that is chosen by the GGSN. The SGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent uplink G-PDUs which are related to the requested PDP context.

The Tunnel Endpoint Identifier Control Plane field specifies an uplink Tunnel Endpoint Identifier for control plane messages, which is chosen by the GGSN. The SGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent uplink-control plane messages, which are related to the requested PDP context. If the GGSN has already confirmed successful assignment of its Tunnel Endpoint Identifier Control Plane to the peer SGSN, this field shall not be present. The GGSN confirms successful assignment of its Tunnel Endpoint Identifier Control Plane to the SGSN when it receives any message with its assigned Tunnel Endpoint Identifier Control Plane in the GTP header from the SGSN.

The GGSN shall include a GGSN Address for control plane and a GGSN address for user traffic, which may differ from that provided by the underlying network service (e.g. IP). The SGSN shall store these GGSN Addresses and use them when sending control plane on this GTP tunnel or G-PDUs to the GGSN for the MS.

If the MS requests a dynamic PDP address with the PDP Type IPv4 or IPv6 and a dynamic PDP address is allowed, then the End User Address information element shall be included and the PDP Address field in the End User Address information element shall contain the dynamic PDP Address allocated by the GGSN. If the MS requests a static PDP address with the PDP Type IPv4 or IPv6, or a PDP address is specified with PDP Type PPP, then the End User Address information element shall not be included. The PDP address in End User Address IE and in the Protocol configuration options IE shall be the same, if both IEs are present in the create PDP context response.

The QoS values supplied in the Create PDP Context Request may be negotiated downwards by the GGSN. The negotiated values or the original values from SGSN are inserted in the Quality of Service Profile information element of the Create PDP Context Response message.

The GGSN may start to forward T-PDUs after the Create PDP Context Response has been sent. The SGSN may start to forward T-PDUs when the Create PDP Context Response has been received. In this case the SGSN shall also be prepared to receive T-PDUs from the GGSN after it has sent a Create PDP Context Request but before a Create PDP Context Response has been received.

The Reordering Required value supplied in the Create PDP Context Response indicates whether the end user protocol benefits from packet in sequence delivery and whether the SGSN and the GGSN therefore shall perform reordering or not. In other words, if reordering is required by the GGSN, the SGSN and the GGSN shall perform reordering of incoming T-PDUs on this path. When the Quality of Service (QoS) Profile is Release 99 the receiving entity shall ignore the Reordering Required.

The GGSN shall include the Recovery information element into the Create PDP Context Response if the GGSN is in contact with the SGSN for the first time or the GGSN has restarted recently and the new Restart Counter value has not yet been indicated to the SGSN. The SGSN receiving the Recovery information element shall handle it as when an Echo Response message is received but shall consider the PDP context being created as active if the response indicates successful context activation at the GGSN.

The Charging ID is used to identify all charging records produced in SGSN(s) and the GGSN for this PDP context. The Charging ID is generated by the GGSN and shall be unique within the GGSN.

The Charging Gateway Address is the IP address of the recommended Charging Gateway Functionality to which the SGSN should transfer the Charging Detail Records (CDR) for this PDP Context.

The optional Private Extension contains vendor or operator specific information.

The Protocol Configuration Options (PCO) information element may be included in the response when the GGSN provides the MS with application specific parameters.

CHANGE REQUEST

⌘ **29.060 CR 301** ⌘ rev **-** ⌘ Current version: **5.0.1** ⌘

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

Proposed change affects: ⌘ (U)SIM ME/UE Radio Access Network Core Network

Title:	⌘ Priority of PDP Contexts at Inter-SGSN RA Update.		
Source:	⌘ CN4		
Work item code:	⌘ TEI5	Date:	⌘ 2002-01-18
Category:	⌘ B	Release:	⌘ Rel-5
	<i>Use one of the following categories:</i> 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.		<i>Use one of the following releases:</i> 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)

Reason for change: ⌘ This contribution introduces the needed stage 3 modifications on GTP protocol corresponding to the enhanced stage 2 functionality as approved by 23.060 CR S2-013051.

If the new SGSN during an Inter SGSN RA Update procedure, can not support all the active PDP Contexts that are transferred from old SGSN, then there is a problem for new SGSN to decide on which PDP Contexts to keep and which to delete.

Due to this problem there are no guarantee that the subscriber will keep the PDP Context that he is currently using, ex. if he has ongoing a file transfer, mail downloading aso.

Instead this currently used PDP Context may be deleted, and a PDP Context that is not really needed for the moment might still be kept.

Since it is only the old SGSN that have the needed information concerning the priority of the PDP contexts, there is a need for the new SGSN to get input from old SGSN before it decides on which PDP Contexts to delete.

The old SGSN should therefore sort the active PDP context in such way that at least the PDP contexts with highest priority will continue to stay active even in the new SGSN.

To avoid Release problems, there is also a need for new SGSN to know whether the old SGSN have applied prioritization of the PDP Contexts or not. If prioritization mechanism is not supported, e.g. old SGSN uses an older GTP version, then by the absent of this indication new SGSN handles the PDP Contexts according to previous releases.

Summary of change: ⌘ It is proposed to make a minor modification to the GTP specification, stating that during the Inter SGSN RA Update procedure the PDP Contexts are sent in a prioritized order instead of randomly as today.

In addition it is proposed to add an indication which informs the new SGSN whether proiritization is applied or not. The new SGSN should then keep the PDP Contexts according to the received order, with the most prioritized PDP context starting from the top of the list sent from old SGSN.

New SGSN should then, if it is unable to maintain all the PDP contexts active, try to keep the PDP contexts according to the prioritized order.

If the indication is absent, the new SGSN acts as none of the PDP Contexts have priority in the sent message.

Consequences if not approved: ☼ GPRS will be perceived as a bad service for the end user since there is a risk that the PDP context(s) currently in use doesn't remain active after roaming, and by that the application will be hanging.

Clauses affected: ☼ 7.5.4, 7.5.6, 7.7.X(new)

Other specs affected: ☼ Other core specifications ☼ 23.060 CR (S2-013051)
 Test specifications
 O&M Specifications

Other comments: ☼

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.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.

7.5.4 SGSN Context Response

The old SGSN shall send an SGSN Context Response to the new SGSN as a response to a previous SGSN Context Request.

Possible Cause values are:

- 'Request Accepted'.
- 'IMSI not known'.
- 'System failure'.
- 'Mandatory IE incorrect'.
- 'Mandatory IE missing'.
- 'Optional IE incorrect'.
- 'Invalid message format'.
- 'P-TMSI Signature mismatch'.

If the Cause contains the value 'Request accepted', all information elements are mandatory, except PDP Context and Private Extension.

If the Cause contains the value 'P-TMSI Signature mismatch' the IMSI information element shall be included in the response, otherwise only the Cause information element shall be included in the response.

The old SGSN shall include a SGSN Address for control plane. The new SGSN shall store this SGSN Address and use it when sending control plane messages for the MS to the old SGSN in the SGSN context transfer procedure.

The Tunnel Endpoint Identifier Control Plane field specifies a Tunnel Endpoint Identifier, which is chosen by the old SGSN. The new SGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent control plane messages, which are sent from the new SGSN to the old SGSN and related to the PDP context(s) requested.

The IMSI information element contains the IMSI matching the TLLI or P-TMSI (for GSM or UMTS respectively) and RAI in the SGSN Context Request.

The MM Context contains necessary mobility management and security parameters.

All active PDP contexts in the old SGSN shall be included as PDP Context information elements. The PDP contexts are included in an implementation dependant prioritized order, and the most important PDP context is placed first. When the PDP Context Prioritization IE is included, it informs the new SGSN that the PDP contexts are sent prioritized. If the new SGSN is not able to maintain active all the PDP contexts received from the old SGSN when it is indicated that prioritization of the PDP contexts is applied, 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.

If there is at least one active PDP context, the old SGSN shall start the T3-TUNNEL timer and store the address of the new SGSN in the "New SGSN Address" field of the MM context. The old SGSN shall wait for SGSN Context Acknowledge before sending T-PDUs to the new SGSN. If the old SGSN has one or more active PDP contexts for the subscriber and an SGSN Context Acknowledge message is not received within a time defined by T3-RESPONSE, the old SGSN shall retransmit the SGSN Context Response to the new SGSN as long as the total number of attempts is less than N3-REQUESTS. After N3-REQUESTS unsuccessfully attempts, the old SGSN shall proceed as described in section 'Reliable delivery of signalling messages' in case the transmission of a control plane message fails N3-REQUESTS times.

Radio Priority SMS contains the radio priority level for MO SMS transmission, and shall be included if a valid Radio Priority SMS value exists for the MS in the old SGSN.

Radio Priority is the radio priority level that the MS uses when accessing the network for the transmission of uplink user data for a particular PDP context. One Radio Priority IE shall be included per PDP context that has a valid radio priority value assigned to it in the old SGSN.

Packet Flow Id is the packet flow identifier assigned to the PDP context. One Packet Flow Id IE shall be included per PDP context that has a valid packet flow identifier value assigned to it in the old SGSN.

The optional Private Extension contains vendor or operator specific information.

Table 27: Information Elements in a SGSN Context Response

Information element	Presence requirement	Reference
Cause	Mandatory	7.7.1
IMSI	Conditional	7.7.2
Tunnel Endpoint Identifier Control Plane	Conditional	7.7.14
Radio Priority SMS	Optional	7.7.20
Radio Priority	Optional	7.7.21
Packet Flow Id	Optional	7.7.22
MM Context	Conditional	7.7.28
PDP Context	Conditional	7.7.29
SGSN Address for Control Plane	Conditional	7.7.32
<u>PDP Context Prioritization</u>	<u>Optional</u>	<u>7.7.xx</u>
Private Extension	Optional	7.7.44

7.5.5 SGSN Context Acknowledge

******NEXT MODIFICATION******

7.5.6 Forward Relocation Request

The old SGSN shall send a Forward Relocation Request to the new SGSN to convey necessary information to perform the SRNS Relocation procedure between new SGSN and Target RNC.

All information elements are mandatory, except PDP Context and Private Extension.

The IMSI information element contains the IMSI of the target MS for SRNS Relocation procedure.

The old SGSN shall include a SGSN Address for control plane. The new SGSN shall store this SGSN Address and use it when sending control plane messages for the MS to the old SGSN in the SRNS Relocation procedure.

The Tunnel Endpoint Identifier Control Plane field specifies a tunnel endpoint identifier, which is chosen by the old SGSN. The new SGSN shall include this Tunnel Endpoint Identifier Control Plane in the GTP header of all subsequent control plane messages, which are sent from the new SGSN to the old SGSN.

The MM Context contains necessary mobility management and security parameters.

All active PDP contexts in the old SGSN shall be included as PDP Context information elements. The PDP contexts are included in an implementation dependant prioritized order, and the most important PDP context is placed first. When the PDP Context Prioritization IE is included, it informs the new SGSN that the PDP contexts are sent prioritized. If the new SGSN is not able to maintain active all the PDP contexts received from the old SGSN when it is indicated that prioritization of the PDP contexts is applied, 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 case no PDP context is active, neither of these this-IEs shall not be included.

UTRAN transparent container, Target identification and RANAP Cause are information from the source RNC in the old SGSN.

The optional Private Extension contains vendor or operator specific information.

Table 29: Information Elements in a Forward Relocation

Information element	Presence requirement	Reference
IMSI	Mandatory	7.7.2
Tunnel Endpoint Identifier Control Plane	Mandatory	7.7.14
RANAP Cause	Mandatory	7.7.18
MM Context	Mandatory	7.7.28
PDP Context	Conditional	7.7.29
SGSN Address for Control plane	Mandatory	7.7.32
Target Identification	Mandatory	7.7.37
UTRAN transparent container	Mandatory	7.7.38
<u>PDP Context Prioritization</u>	<u>Optional</u>	<u>7.7.xx</u>
Private Extension	Optional	7.7.44

7.5.7 Forward Relocation Response

******NEXT MODIFICATION******

7.7.xx PDP Context Prioritization

The PDP Context Prioritization information element is used by the old SGSN to inform the new SGSN that prioritisation of the PDP Contexts has been applied. When the information element is included, the length is set to zero.

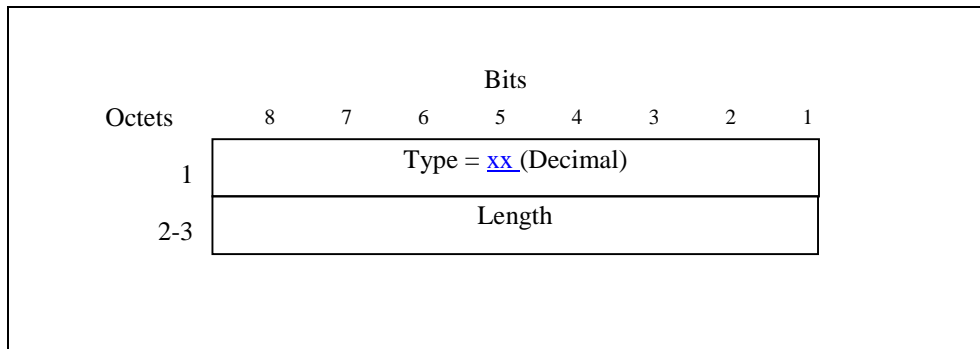


Figure xx : PDP Context Prioritization Information Element

CHANGE REQUEST

29.060 CR 300 rev 3 Current version: 5.0.1

Proposed change affects: (U)SIM ME/UE Radio Access Network Core Network

Title:	Generic RAN Information Procedure		
Source:	Ericsson		
Work item code:	TEI5	Date:	2002-02-26
Category:	B	Release:	REL-5
<p>Use <u>one</u> of the following categories:</p> <p>F (essential 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>2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)</p>	

Reason for change:	The Generic RAN Information Procedure is introduced in order to facilitate exchange of information between BSCs over and transparent to the core network. The first application to use the procedure is the External NACC (Network Assisted Cell Change) feature, which supports (E)GPRS mobile stations at cell change between cells belonging to different BSCs.
Summary of change:	A new GTP message and a procedure description are added for the generic RAN Information procedure.
Consequences if not approved:	The cell reselection outage time for (E)GPRS cell reselection between cells belonging to BSCs controlled from different SGSNs can not be shortened if the RAN Information procedure is not included.

Clauses affected:	2, 3.2, 7.1, 7.5x, 7.7, 7.7.43, 8.2. 10.1.1.4		
Other specs affected:	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications		
Other comments:			

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] 3GPP TR 21.905: "3G Vocabulary".
- [2] 3GPP TS 23.003: "Numbering, addressing and identification".
- [3] 3GPP TS 23.007: "Restoration Procedures".
- [4] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service Description; Stage 2".
- [5] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols-Stage 3".
- [6] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".
- [7] 3GPP TS 25.413: "UTRAN Iu interface RANAP signalling".
- [8] 3GPP TS 33.102: "Security Architecture".
- [9] 3GPP TS 43.020: " Security related network functions".
- [10] 3GPP TS 43.064: " Overall description of the GPRS Radio Interface; Stage 2".
- [11] 3GPP TS 44.064: " Mobile Station - Serving GPRS Support Node (MS-SGSN) Logical Link Control (LLC) Layer Specification".
- [12] STD 0005: "Internet Protocol", J. Postel.
- [13] STD 0006: "User Datagram Protocol", J. Postel.
- [14] RFC 1700: "Assigned Numbers", J. Reynolds and J. Postel.
- [15] RFC 2181: "Clarifications to the DNS Specification", R. Elz and R. Bush.
- [16] 3GPP TS 23.007: "Restoration Procedures".
- [17] 3GPP TS 23.121: "Architectural Requirements for Release 1999".
- [18] 3GPP TS 32.215 : "Charging data description for the packet switched domain".
- [19] 3GPP TS 23.236: "Intra Domain Connection of RAN Nodes to Multiple CN Nodes".
- [20] [3GPP TS 48.018: "Base Station System \(BSS\) - Serving GPRS Support Node \(SGSN\); BSS GPRS Protocol \(BSSGP\)".](#)
- [21] [3GPP TR 44.901: "External Network assisted Cell Change; \(Release 5\)".](#)

Next Modified section

3.2 Abbreviations

Abbreviations used in the present document are listed in GSM 01.04.

For the purposes of the present document, the following additional abbreviations apply:

BB	Backbone Bearer
DF	Don't Fragment
FFS	For Further Study
GTP	GPRS Tunnelling Protocol
GTP-C	GTP Control
GTP-U	GTP User
IANA	Internet Assigned Number Authority
ICMP	Internet Control Message Protocol
IE	Information Element
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
MTU	Maximum Transmission Unit
NACC	Network Assisted Cell Change
QoS	Quality of Service
RAN	Radio Access Network
RANAP	Radio Access Network Application Part
RIM	RAN Information Management
RNC	Radio Network Controller
TEID	Tunnel Endpoint Identifier
TFT	Traffic Flow Template
UDP	User Datagram Protocol
UTRAN	UMTS Terrestrial Radio Access Network
Gn interface	Interface between GPRS Support Nodes (GSNs) within a PLMN
Gp interface	Interface between GPRS Support Nodes (GSNs) in different PLMNs

[Next Modified section](#)

7 GTP Messages and Message Formats

7.1 Message Formats

GTP defines a set of messages between two associated GSNs or an SGSN and an RNC. The messages to be used are defined in the table below. The three columns to the right define which parts (GTP-C, GTP-U or GTP') that send or receive the specific message type.

Table 1: Messages in GTP

Message Type value (Decimal)	Message	Reference	GTP-C	GTP-U	GTP'
0	For future use. Shall not be sent. If received, shall be treated as an Unknown message.				
1	Echo Request	7.2.1	X	X	x
2	Echo Response	7.2.2	X	X	x
3	Version Not Supported	7.2.3	X		x
4	Node Alive Request	GSM 12.15			X
5	Node Alive Response	GSM 12.15			X
6	Redirection Request	GSM 12.15			X
7	Redirection Response	GSM 12.15			X
8-15	For future use. Shall not be sent. If received, shall be treated as an Unknown message.				
16	Create PDP Context Request	7.3.1	X		
17	Create PDP Context Response	7.3.2	X		
18	Update PDP Context Request	7.3.3	X		
19	Update PDP Context Response	7.3.4	X		
20	Delete PDP Context Request	7.3.5	X		
21	Delete PDP Context Response	7.3.6	X		
22-25	For future use. Shall not be sent. If received, shall be treated as an Unknown message.				
26	Error Indication	7.3.7		X	
27	PDU Notification Request	7.3.8	X		
28	PDU Notification Response	7.3.9	X		
29	PDU Notification Reject Request	7.3.10	X		
30	PDU Notification Reject Response	7.3.11	X		
31	Supported Extension Headers Notification	7.2.4	X	X	
32	Send Routing Information for GPRS Request	7.4.1	X		
33	Send Routing Information for GPRS Response	7.4.2	X		
34	Failure Report Request	7.4.3	X		
35	Failure Report Response	7.4.4	X		
36	Note MS GPRS Present Request	7.4.5	X		
37	Note MS GPRS Present Response	7.4.6	X		
38-47	For future use. Shall not be sent. If received, shall be treated as an Unknown message.				
48	Identification Request	7.5.1	X		
49	Identification Response	7.5.2	X		
50	SGSN Context Request	7.5.3	X		
51	SGSN Context Response	7.5.4	X		
52	SGSN Context Acknowledge	7.5.5	X		
53	Forward Relocation Request	7.5.6	X		
54	Forward Relocation Response	7.5.7	X		
55	Forward Relocation Complete	7.5.8	X		
56	Relocation Cancel Request	7.5.9	X		
57	Relocation Cancel Response	7.5.10	X		
58	Forward SRNS Context	7.5.11	X		
59	Forward Relocation Complete Acknowledge	7.5.x	X		
60	Forward SRNS Context Acknowledge	7.5.x	X		
61- 69 239	For future use. Shall not be sent. If received, shall be treated as an Unknown message.				
70	RAN Information Relay	7.5xxa.1	X		
71-239	For future use. Shall not be sent. If received, shall be treated as an Unknown message.				
240	Data Record Transfer Request	GSM 12.15			X
241	Data Record Transfer Response	GSM 12.15			X
242-254	For future use. Shall not be sent. If received, shall be treated as an Unknown message.				
255	G-PDU	9.3.1		X	

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7.xx5a RANan Information Management Messages

The RANan Information Relay is used over the Gn interface to tunnel RAN INFORMATION messages (i.e. any of the RAN INFORMATION, RAN INFORMATION REQUEST, RAN INFORMATION ACK or RAN INFORMATION ERROR message) received by an SGSN from a BSS. The RAN INFORMATION messages are therefore sent from a source BSS through one or more SGSN(s) to a destination BSS (see figure 7.5a.1). The procedures are specified in 3GPP TS 23.060 [4] and the RAN INFORMATION messages are specified in 3GPP TS 48.018 [20].

If an SGSN receives a RAN INFORMATION message (See 3GPP TS 48.018) from a BSS and the Destination Cell (addressed by Routing Area Identity + Cell Identity) is controlled by another SGSN, the source SGSN shall translate these address parameters to a destination SGSN address.

The address translation mechanism is implementation specific. Some possible translation mechanisms are found in Annex C in 3GPP TS 23.003.

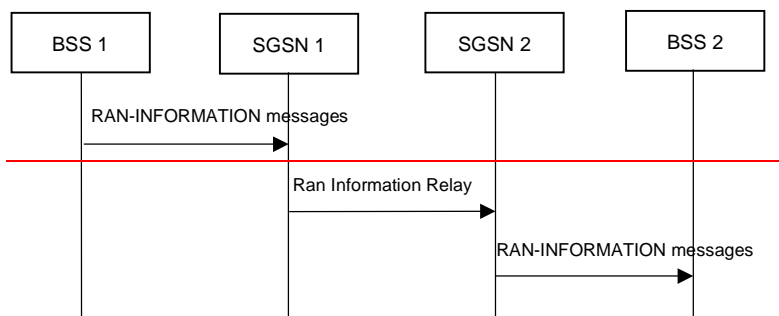


Figure 7.5a.1. RAN Information procedure.

7.5xxa.1 RAN Information Relay

All information elements from the RAN INFORMATION messages, starting from and including the BSSGP ‘PDU type’, shall be contained within the RAN Transparent Container and forwarded to the destination SGSN in the RANan Information Relay message. For handling of protocol errors the RAN Information Relay message is treated as a Response message.

The optional Private Extension contains vendor or operator specific information.

Table 7.xx5a.1: Information Elements in a RAN Information Relay

Information element	Presence requirement	Reference
RAN Transparent Container	Mandatory	7.7.xx25C
Private Extension	Optional	7.7.44

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7.7 Information Elements

A GTP Signalling message may contain several information elements. The TLV (Type, Length, Value) or TV (Type, Value) encoding format shall be used for the GTP information elements. The information elements shall be sorted, with the Type fields in ascending order, in the signalling messages. The Length field contains the length of the information element excluding the Type and Length field.

For all the length fields, bit 8 of the lowest numbered octet is the most significant bit and bit 1 of the highest numbered octet is the least significant bit.

Within information elements, certain fields may be described as spare. These bits shall be transmitted with the value defined for them. To allow for future features, the receiver shall not evaluate these bits.

The most significant bit in the Type field is set to 0 when the TV format is used and set to 1 for the TLV format.

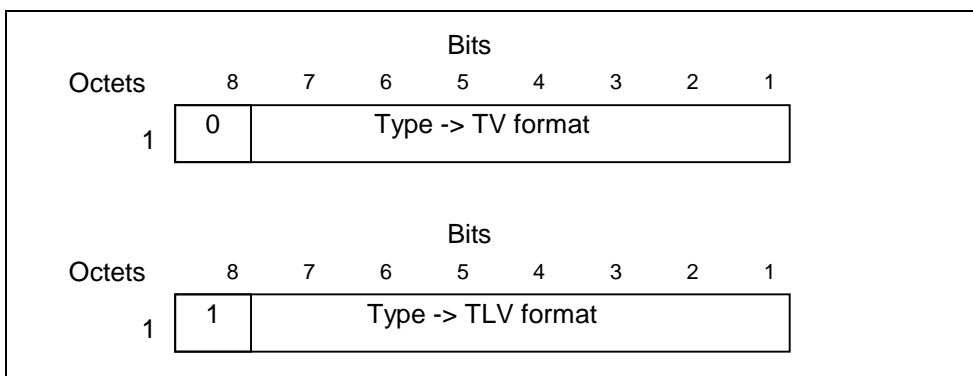


Figure 8: Type field for TV and TLV format

Table 37: Information Elements

IE Type Value	Format	Information Element	Reference
1	TV	Cause	7.7.1
2	"	International Mobile Subscriber Identity (IMSI)	7.7.2
3	"	Routeing Area Identity (RAI)	7.7.3
4	"	Temporary Logical Link Identity (TLLI)	7.7.4
5	"	Packet TMSI (P-TMSI)	7.7.5
6-7	Spare		
8	"	Reordering Required	7.7.6
9	"	Authentication Triplet	7.7.7
10	Spare		
11	"	MAP Cause	7.7.8
12	"	P-TMSI Signature	7.7.9
13	"	MS Validated	7.7.10
14	"	Recovery	7.7.11
15	"	Selection Mode	7.7.12
16	"	Tunnel Endpoint Identifier Data I	7.7.13
17	"	Tunnel Endpoint Identifier Control Plane	7.7.14
18	"	Tunnel Endpoint Identifier Data II	7.7.15
19	"	Teardown Ind	7.7.16
20	"	NSAPI	7.7.17
21	"	RANAP Cause	7.7.18
22	"	RAB Context	7.7.19
23	"	Radio Priority SMS	7.7.20
24	"	Radio Priority	7.7.21
25	"	Packet Flow Id	7.7.22
26	"	Charging Characteristics	7.7.23
27	"	Trace Reference	7.7.24
28	"	Trace Type	7.7.25
29	"	MS Not Reachable Reason	7.7.25A
30	"	Radio Priority LCS	7.7.25B
117-126	Reserved for the GPRS charging protocol (see GTP' in GSM 12.15)		
127	"	Charging ID	7.7.26
128	TLV	End User Address	7.7.27
129	"	MM Context	7.7.28
130	"	PDP Context	7.7.29
131	"	Access Point Name	7.7.30
132	"	Protocol Configuration Options	7.7.31
133	"	GSN Address	7.7.32
134	"	MS International PSTN/ISDN Number (MSISDN)	7.7.33
135	"	Quality of Service Profile	7.7.34
136	"	Authentication Quintuplet	7.7.35
137	"	Traffic Flow Template	7.7.36
138	"	Target Identification	7.7.37
139	"	UTRAN Transparent Container	7.7.38
140	"	RAB Setup Information	7.7.39
141	"	Extension Header Type List	7.7.40
142	"	Trigger Id	7.7.41
143	"	OMC Identity	7.7.42
144	"	RAN Transparent Container	7.7.xx43
239-250	Reserved for the GPRS charging protocol (see GTP' in GSM 12.15)		
251	"	Charging Gateway Address	7.7.43
252-254	Reserved for the GPRS charging protocol (see GTP' in GSM 12.15)		
255	"	Private Extension	7.7.44

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7.7.xx43 RAN Transparent Container

The information in the value part of the RAN Transparent Container IE contains all information elements (starting with and including the BSSGP ‘PDU Type’) in either of the RAN INFORMATION, RAN INFORMATION REQUEST, RAN INFORMATION ACK or RAN INFORMATION ERROR messages respectively as specified in 3GPP TS 48.018 [20].

The two octets Length field holds the length of the RAN Transparent Container field Container (octets 4-n).

Octets	8	7	6	5	4	3	2	1
1	Type =144 (Decimal)							
2-3	Length							
4-n	RAN Transparent Container field							

Figure X: RANan Transparent Container Information Element

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8.2 Usage of the GTP-C Header

For control plane messages the GTP header shall be used as follows:

- Version shall be set to decimal 1 ('001').
- Protocol Type (PT) shall be set to '1'.
- (S) shall be set to '1'.
- PN shall be set to '0'. A GTP-C receiver shall ignore this flag.
- Message Type shall be set to the unique value that is used for each type of control plane message. Valid message types are marked with an x in the GTP-C column in Table 1.
- Length shall be the length in octets of the payload, i.e. the rest of the packet following the mandatory part of the GTP header (that is the first 8 octets). The Sequence Number, the N-PDU Number or any Extension headers shall be considered to be part of the payload, i.e. included in the length count.
- The Tunnel Endpoint Identifier is set by the sending entity to the value requested by the corresponding entity (SGSN or GGSN); it identifies all the PDP Contexts with the same PDP address and APN (for Tunnel Management messages) or it identifies each MS and its associated context data(for messages not related to Tunnel Management), except for the following cases:
 - The Create PDP Context Request message for a given MS sent to a specific GGSN shall have the Tunnel Endpoint Identifier set to all zeros, if the SGSN has not been assigned a Tunnel Endpoint Identifier Control Plane by the GGSN.
 - The Update PDP Context Request message for a given MS sent to a specific GGSN shall have the Tunnel Endpoint Identifier set to all zeros, if it is used to switch the GTP version of the tunnel to the GGSN from GTP v0 to GTP v1.
 - The Identification Request/Response messages, where the Tunnel Endpoint Identifier shall be set to all zeros.

- The SGSN Context Request message, where the Tunnel Endpoint Identifier shall be set to all zeros.
- The Echo Request/Response, Supported Extension Headers notification and the Version Not Supported messages, where the Tunnel Endpoint Identifier shall be set to all zeros.
- The Forward Relocation Request message, where the Tunnel Endpoint Identifier shall be set to all zeros.
- The PDU Notification Request message, where the Tunnel Endpoint Identifier shall be set to all zeros.
- [The RAN Information Relay message, where the Tunnel Endpoint Identifier shall be set to all zeros.](#)
- The Relocation Cancel Request message where the Tunnel Endpoint Identifier shall be set to all zeros, except for the case where the old SGSN has already been assigned the Tunnel Endpoint Identifier Control Plane of the new SGSN.
- All Location Management messages, where the Tunnel Endpoint Identifier shall be set to all zeros.

The GSN Address for Control Plane set in the request message could be different from the IP Source address of the message. The Tunnel Endpoint Identifier notified in the request message is also used in this case for sending the corresponding response message.

- Sequence Number shall be a message number valid for a path. Within a given set of contiguous Sequence Numbers from 0 to 65535, a given Sequence Number shall, if used, unambiguously define a GTP control plane request message sent on the path (see section Reliable delivery of signalling messages). The Sequence Number in a control plane response message shall be copied from the control plane request message that the GSN is replying to. For GTP-C messages not having a defined response message for a request message, i.e. for messages Version Not Supported, [RAN Information Relay](#) and Supported Extension Headers Notification, the Sequence Number shall be ignored by the receiver.
- N-PDU Number shall not be interpreted.

The GTP-C header may be followed by subsequent information elements dependent on the type of control plane message. Only one information element of each type is allowed in a single control plane message, except for the Authentication Triplet, the PDP Context and the Tunnel Endpoint Identifier Data II information element where several occurrences of each type are allowed.

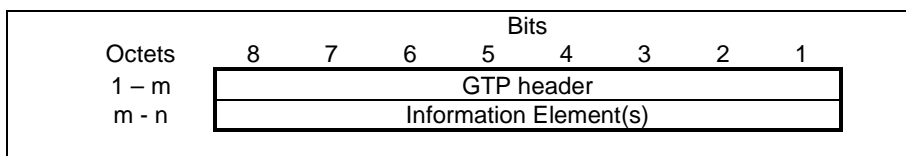


Figure 61: GTP Header followed by subsequent Information Elements

10.1.1.4 Error Indication, [RAN Information Relay](#), Version Not Supported and Supported Extension Headers Notification

The UDP destination port for the Error Indication shall be the user plane UDP port (2152).

The UDP destination port for the Version Not Supported [and the RAN Information Relay](#) messages shall be the control plane UDP port (2123).

The UDP destination port for the Supported Extension Headers Notification shall be the UDP port for User plane (2152) if the trigger for it was a user plane message, the control plane port (2123) if the trigger for it was a control plane message.

The UDP source port shall be locally assigned at the sending node.

10.1.2.3 Error Indication, [RAN Information Relay](#), Version Not supported and Supported Extension Headers Notification

The IP source address shall be an address of the source GSN/RNC from which the message is originated. In particular, the source Address of the "Version Not Supported" or the "Supported Extension Headers Notification" message, shall be set to the destination address of the message that triggered the GSN/RNC to send the "Version Not Supported" or the "Supported Extension Headers Notification" message.

The IP destination address [for Error Indication, Version Not Supported and Supported Extension Headers Notification](#) shall be the source address of the GTP-PDU that is the cause for the GSN/RNC to send one of these messages. [The IP destination address for RAN Information Relay is the address of the SGSN which the messages is relayed to.](#)

11.1 Protocol Errors

A protocol error is defined as a message with unknown, unforeseen or erroneous content. The term silently discarded used in the following sub clauses means that the implementation shall discard the message without further processing and should log the event including the erroneous message and should include the error in a statistical counter.

An information element with 'Mandatory' in the 'Presence requirement' column of a message definition shall always be present in that message.

The conditions for a conditional information element define whether the information element is semantically:

- mandatorily present;
- optionally present;
- mandatorily absent.

An information element, which is semantically mandatorily present but is omitted from the message, is treated as missing data.

An information element, which is semantically mandatorily absent but is present in the message, is treated as unexpected data.

The Error Indication, ~~the~~ Version Not Supported, [RAN Information Relay](#), Supported Extension Headers Notification and the SGSN Context Acknowledge messages shall be considered as Responses for the purpose of this Section.

The sub clauses 11.1.1 to 11.1.13 shall be applied in decreasing priorities.

CHANGE REQUEST

⌘ **29.060 CR 297** ⌘ rev **1** ⌘ Current version: **5.0.1** ⌘

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

Proposed change affects: ⌘ (U)SIM ME/UE Radio Access Network Core Network

Title:	⌘ Re-define the attributions of GTP Information Element		
Source:	⌘ CN4		
Work item code:	⌘ GTP enhancement	Date:	⌘ 14 th February 2002
Category:	⌘ F	Release:	⌘ REL5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2 (GSM Phase 2)	
	A (corresponds to a correction in an earlier release)	R96 (Release 1996)	
	B (addition of feature),	R97 (Release 1997)	
	C (functional modification of feature)	R98 (Release 1998)	
	D (editorial modification)	R99 (Release 1999)	
	Detailed explanations of the above categories can be found in 3GPP TR 21.900.		REL-4 (Release 4)
			REL-5 (Release 5)

Reason for change:	⌘ In current 29.060 GTP spec, the Conditional of IE's presence requirement are defined in section 3.1 as below: <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p><i>Conditional: When the presence requirement for the information element is conditional, the receiving protocol level can check the presence or absence of an IE based on the received information.</i></p> </div> <p>However the usage of Conditional through current GTP spec does not match its definition. Meanwhile the definition of other two presence requirements (Mandatory and Optional) are missing.</p>
Summary of change:	⌘ New definition of these three IE presence requirements are created in a new subclause.
Consequences if not approved:	⌘ The issues lead interoperability problem between GSNs if each GSN node is made by different vendors.

Clauses affected:	⌘ 3.1, 7.1.1		
Other specs affected:	⌘ <input type="checkbox"/> Other core specifications	⌘	
	<input type="checkbox"/> Test specifications		
	<input type="checkbox"/> O&M Specifications		
Other comments:	⌘		

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.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.

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

Conditional: When the presence requirement for the information element is conditional, the receiving protocol level can check the presence or absence of an IE based on the received information.

G-PDU: A G-PDU is a user data message. It consists of a T-PDU plus a GTP header.

GTP Tunnel: A GTP tunnel in the GTP-U plane is defined for each PDP Context in the GSNs and/or each RAB in the RNC. A GTP tunnel in the GTP-C plane is defined for all PDP Contexts with the same PDP address and APN (for Tunnel Management messages) or for each MS (for messages not related to Tunnel Management). A GTP tunnel is identified in each node with a TEID, an IP address and a UDP port number. A GTP tunnel is necessary to forward packets between an external packet data network and an MS user.

MM Context: Information sets held in MS and GSNs for a GPRS subscriber related to mobility management (MM) (please refer to the MM Context Information Element).

NSAPI: Network Service Access Point Identifier. An integer value in the range [0; 15], identifying a certain PDP Context. It identifies a PDP context belonging to a specific MM Context ID.

Path: UDP/IP path is used to multiplex GTP tunnels.

Path Protocol: Path Protocol is the protocol used as a bearer of GTP between GSNs or between a GSN and a RNC.

PDP: Packet Data Protocol (PDP) is a network protocol used by an external packet data network interfacing to GPRS.

PDP Context: Information sets held in MS and GSNs for a PDP address (please refer to the PDP Context Information Element).

Quality of Service: Quality of Service may be applicable for the GPRS backbone and the Iu interface if the path media supports it. Separate paths with different priorities may be defined between a GSN pair or between a GSN and an RNC.

GTP-C Message: GTP-C or control plane messages are exchanged between GSN/RNC pairs in a path. The control plane messages are used to transfer GSN capability information between GSN pairs, to create, update and delete GTP tunnels and for path management.

GTP-U Message: GTP-U or user plane messages are exchanged between GSN pairs or GSN/RNC pairs in a path. The user plane messages are used to carry user data packets, and signalling messages for path management and error indication.

GTP-PDU: A GTP Protocol Data Unit is either a GTP-C message or a GTP-U message.

Signalling Message: Any GTP-PDU except the G-PDU.

T-PDU: Original packet, for example an IP datagram, from an MS or a network node in an external packet data network. A T-PDU is the payload that is tunnelled in the GTP-U tunnel.

Traffic Flow Template: TFTs are used by GGSN to distinguish between different user payload packets and transmit packets with different QoS requirements via different PDP context but to the same PDP address.

Tunnel Endpoint Identifier (TEID): The TEID unambiguously identifies a tunnel endpoint in the receiving GTP-U or GTP-C protocol entity. The receiving end side of a GTP tunnel locally assigns the TEID value the transmitting side has to use. The TEID values are exchanged between tunnel endpoints using GTP-C (or RANAP, over the Iu) messages.

UDP/IP Path: UDP/IP path is a connection-less unidirectional or bidirectional path defined by two end-points. An IP address and a UDP port number define an end-point. A UDP/IP path carries GTP messages between GSN nodes, and between GSN and RNC nodes related to one or more GTP tunnels.

*** NEXT CHANGE ***

7.1.1 Presence requirements of Information Elements

There are three different presence requirements (Mandatory, Conditional, or Optional) for an IE within a given GTP-PDU:

- **Mandatory** means that the IE shall be included by the sending side, and that the receiver diagnoses a "Mandatory IE missing" error when detecting that the IE is not present.
- **Conditional** means:
 - that inclusion of the IE by the sender depends on conditions specified in the relevant protocol specification;
 - that the receiver can expect that the IE is present based on its parameter combination in the message and/or on the state of the receiving node.
- **Optional** means that the IE shall be included as a service option. Therefore, the IE may be included or not in a message.

For error handling, refer to section 11.

CHANGE REQUEST

⌘ **29.060 CR 294** ⌘ rev **1** ⌘ Current version: **5.0.1** ⌘

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

Proposed change affects: ⌘ (U)SIM ME/UE Radio Access Network Core Network

Title:	⌘ Dangling PDP contexts handling		
Source:	⌘ CN4		
Work item code:	⌘ GTP enhancements	Date:	⌘ 26-01-2002
Category:	⌘ B	Release:	⌘ 5
	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: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)

Reason for change:	⌘ If the GGSN detects some prolonged inactivity in some PDP contexts, it may be possible these are dangling. A GGSN vendor may want to implement some "garbage collection" policy by verifying a PDP context is still active and not dangling. If it is dangling then resources are freed.
Summary of change:	⌘ The GGSN initiated Update PDP context is used to probe the SGSN for PDP context that are candidate to be considered dangling. The IMSI optional IE is added to allow for the case that the SGSN has re-assigned the TEID to another PDP session.
Consequences if not approved:	⌘ The issue of how to detect a PDP context is dangling would be open

Clauses affected:	⌘ 7.3.3; 7.3.4	
Other specs affected:	⌘ <input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘
Other comments:	⌘	

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- 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.

7.3.3 Update PDP Context Request

An Update PDP Context Request message shall be sent from a SGSN to a GGSN as part of the GPRS Inter SGSN Routeing Update procedure or the PDP Context Modification procedure or to redistribute contexts due to load sharing. It shall be used to change the QoS and the path. In addition it shall be used if it is necessary to change the GTP version of a tunnel to a GGSN from GTP v0 to GTP v1. The message shall be sent by the new SGSN at the Inter SGSN Routeing Update procedure.

The NSAPI information element together with the Tunnel Endpoint Identifier in the GTP header unambiguously identifies a PDP Context in the GGSN.

The IMSI shall be included if the message is sent during an Inter SGSN change when changing the GTP version from GTP v0 to GTP v1; this is required, as the TEID in the header of the message is set to all zeros in this case.

The Tunnel Endpoint Identifier Data field specifies a downlink Tunnel Endpoint Identifier for G-PDUs which is chosen by the SGSN. The GGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent downlink G-PDUs that are related to the requested PDP context.

The Tunnel Endpoint Identifier Control Plane field specifies a downlink Tunnel Endpoint Identifier Control Plane messages which is chosen by the SGSN. The GGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent downlink control plane messages that are related to the requested PDP context. If the SGSN has already confirmed successful assignment of its Tunnel Endpoint Identifier Control Plane to the peer GGSN, this field shall not be present. The SGSN confirms successful assignment of its Tunnel Endpoint Identifier Control Plane to the GGSN when it receives any message with its assigned Tunnel Endpoint Identifier Control Plane in the GTP header from the GGSN.

The Quality of Service Profile information element shall include the QoS negotiated between the MS and SGSN at PDP Context activation or the new QoS negotiated in the PDP Context Modification procedure.

The SGSN shall include an SGSN Address for control plane and an SGSN address for user traffic, which may differ from that provided by the underlying network service (e.g. IP). The GGSN shall store these SGSN Addresses and use them when sending subsequent control plane on this GTP tunnel or G-PDUs to the SGSN for the MS. When active contexts are being redistributed due to load sharing, G-PDUs that are in transit across the Gn-interface are in an undetermined state and may be lost.

The SGSN shall include a Recovery information element into the Update PDP Context Request if the SGSN is in contact with the GGSN for the very first time or if the SGSN has restarted recently and the new Restart Counter value has not yet been indicated to the GGSN. The GGSN that receives a Recovery information element in the Update PDP Context Request message element shall handle it in the same way as when receiving an Echo Response message. The Update PDP Context Request message shall be considered as a valid update request for the PDP context indicated in the message.

The Traffic Flow Template (TFT) is used to distinguish between different user traffic flows.

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 request received from the HLR or OMC.

The optional Private Extension contains vendor or operator specific information.

Table 7: Information Elements in an SGSN-Initiated Update PDP Context Request

Information element	Presence requirement	Reference
IMSI	Conditional	7.7.2
Recovery	Optional	7.7.11
Tunnel Endpoint Identifier Data I	Mandatory	7.7.13
Tunnel Endpoint Identifier Control Plane	Conditional	7.7.14
NSAPI	Mandatory	7.7.17
Trace Reference	Optional	7.7.24
Trace Type	Optional	7.7.25
SGSN Address for Control Plane	Mandatory	GSN Address 7.7.32
SGSN Address for User Traffic	Mandatory	GSN Address 7.7.32
Quality of Service Profile	Mandatory	7.7.34
TFT	Optional	7.7.36
Trigger Id	Optional	7.7.41
OMC Identity	Optional	7.7.42
Private Extension	Optional	7.7.44

An Update PDP Context Request may also be sent from a GGSN to a SGSN to re-negotiate the QoS of a PDP context. The GGSN-initiated Update PDP Context Request can also be used to provide a PDP address to the SGSN (and MS). The latter shall be used by GGSN when it acts as a DHCP Relay Agent or Mobil IP Foreign Agent. A GGSN may send an update PDP context to a SGSN to check that the PDP context is still active at the SGSN. In such a case, the GGSN shall include the optional IMSI IE, to add robustness against the case the SGSN has re-assigned the TEID to another PDP context (this may happen when the PDP context is dangling at the GGSN). Also, the "Quality of service profile" IE and the "End user Address" IE shall not be included in this case.

The Quality of Service Profile information element shall include the GGSN requested QoS.

The End User Address information element shall contain a valid IPv4 or IPv6 address.

The GGSN shall include a Recovery information element into the Update PDP Context Request if the GGSN has restarted recently and the new Restart Counter value has not yet been indicated to the SGSN. The SGSN that receives a Recovery information element in the Update PDP Context Request message element shall handle it in the same way as when receiving an Echo Response message. The Update PDP Context Request message shall be considered as a valid update request for the PDP context indicated in the message.

The NSAPI information element together with the Tunnel Endpoint Identifier in the GTP header unambiguously identifies a PDP Context in the SGSN.

The optional Private Extension contains vendor or operator specific information.

Table 8: Information Elements in a GGSN-Initiated Update PDP Context

Information element	Presence requirement	Reference
<u>IMSI</u>	<u>optional</u>	<u>7.7.2</u>
Recovery	Optional	7.7.11
NSAPI	Mandatory	7.7.17
End User Address	Optional	7.7.27
Quality of Service Profile	Optional	7.7.34
Private Extension	Optional	7.7.44

7.3.4 Update PDP Context Response

The message shall be sent from a GGSN node to a SGSN node as a response of an Update PDP Context Request.

If the SGSN receives an Update PDP Context Response with a Cause value other than 'Request accepted', it shall abort the update of the PDP context.

Only the Cause information element and optionally the Recovery information element shall be included in the response if the Cause contains another value than 'Request accepted'.

Possible Cause values are:

- 'Request Accepted'.
- 'Non-existent'.
- 'Service not supported'.
- 'System failure'.
- 'Semantic error in the TFT operation'.
- 'Syntactic error in the TFT operation'.
- 'Semantic errors in packet filter(s)'.
- 'Syntactic errors in packet filters(s)'.
- 'Mandatory IE incorrect'.
- 'Mandatory IE missing'.
- 'Optional IE incorrect'.
- 'Invalid message format'.

The Tunnel Endpoint Identifier Data field specifies an uplink Tunnel Endpoint Identifier for G-PDUs that is chosen by the GGSN. The SGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent uplink G-PDUs that are related to the requested PDP context. This information element shall be included if the Cause contains the value 'Request accepted'.

The Tunnel Endpoint Identifier Control Plane field specifies an uplink Tunnel Endpoint Identifier Control Plane messages which is chosen by the GGSN. The SGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent uplink control plane messages which are related to the requested PDP context. If the GGSN has already confirmed successful assignment of its Tunnel Endpoint Identifier Control Plane to the peer SGSN, this field shall not be present. The GGSN confirms successful assignment of its Tunnel Endpoint Identifier Control Plane to the SGSN when it receives any message with its assigned Tunnel Endpoint Identifier Control Plane in the GTP header from the SGSN.

The QoS values supplied in the Update PDP Context Request may be negotiated downwards by the GGSN. The negotiated values or the original value from SGSN is inserted in the Quality of Service Profile information element. This information element shall be included if the Cause contains the value 'Request accepted'.

The GGSN may start to forward T-PDUs after the Update PDP Context Response has been sent. The SGSN may start to forward T-PDUs when the Update PDP Context Response has been received. In this case the SGSN shall also be prepared to receive T-PDUs from the GGSN after it has sent an Update PDP Context Request but before an Update PDP Context Response has been received.

The GGSN shall include a GGSN address for user traffic, which may differ from that provided by the underlying network service (e.g. IP). The SGSN shall store this GGSN Address and use it when sending G-PDUs to the GGSN for the MS. When active contexts are being redistributed due to load sharing, G-PDUs that are in transit across the Gn-interface are in an undetermined state and may be lost. The GGSN shall also include a GGSN address for control plane, which shall not differ from that provided at PDP context setup time and shall remain unchanged for the lifetime of the PDP context. The GGSN Address for control plane and the GGSN Address for user traffic shall be included if the Cause contains the value 'Request accepted'.

The GGSN shall include the Recovery information element into the Update PDP Context Response if the GGSN is in contact with the SGSN for the first time or if the GGSN has restarted recently and the new Restart Counter value has not yet been indicated to the SGSN. The SGSN receiving the Recovery information element shall handle it as when an Echo Response message is received but shall consider the PDP context as updated and active if the response cause indicates a successful operation at the GGSN.

The Charging ID is used to identify all charging records produced in SGSN(s) and the GGSN for this PDP context. The Charging ID has been previously generated by the GGSN and is unique for this PDP context. If an inter-SGSN routing area update occurs, it is transferred to the new SGSN as part of each active PDP context. This information element shall be included if the Cause contains the value 'Request accepted'.

The Charging Gateway Address is the IP address of the recommended Charging Gateway Functionality to which the SGSN should transfer the Charging Detail Records (CDR) for this PDP Context.

The optional Private Extension contains vendor or operator specific information.

Table 9: Information Elements in an Update PDP Context Response sent by a GGSN

Information element	Presence requirement	Reference
Cause	Mandatory	7.7.1
Recovery	Optional	7.7.11
Tunnel Endpoint Identifier Data I	Conditional	7.7.13
Tunnel Endpoint Identifier Control Plane	Conditional	7.7.14
Charging ID	Conditional	7.7.26
GGSN Address for Control Plane	Conditional	GSN Address 7.7.32
GGSN Address for User Traffic	Conditional	GSN Address 7.7.32
Quality of Service Profile	Conditional	7.7.34
Charging Gateway Address	Optional	7.7.43
Private Extension	Optional	7.7.44

The message can also be sent from a SGSN node to a GGSN node as a response of a GGSN-initiated Update PDP Context Request.

If the GGSN receives an Update PDP Context Response with a Cause value other than 'Request accepted', it shall abort the update of the PDP context if the associated Update PDP Context Request was sent only to re-negotiate the QoS of a PDP context. Furthermore if the associated Update PDP Context Request included an 'End User Address' information element the GGSN shall delete the PDP context using the Delete PDP Context procedure and may notify the Operation and Maintenance network element.

Only the Cause information element and optionally the Recovery information element shall be included in the response if the Cause contains another value than 'Request accepted'.

Possible Cause values are the same as for the Update PDP Context Response sent by a GGSN. When the optional IMSI IE value differs from the IMSI IE value associated to the PDP context, the SGSN shall respond using the cause value 'Non-existent'.

The QoS values supplied in the Update PDP Context Request may be negotiated downwards by the SGSN. The negotiated values or the original value from GGSN is inserted in the Quality of Service Profile information element. This information element shall be included if the Cause contains the value 'Request accepted' and a QoS information element was supplied in the corresponding request message.

The SGSN shall include the Recovery information element into the Update PDP Context Response if the SGSN has restarted recently and the new Restart Counter value has not yet been indicated to the GGSN. The GGSN receiving the Recovery information element shall handle it as when an Echo Response message is received but shall consider the PDP context as updated and active if the response cause indicates a successful operation at the SGSN.

Table 10: Information Elements in an Update PDP Context Response sent by a

Information element	Presence requirement	Reference
Cause	Mandatory	7.7.1
Recovery	Optional	7.7.11
Quality of Service Profile	Conditional	7.7.34
Private Extension	Optional	7.7.44

CHANGE REQUEST

⌘ **29.060 CR 291** ⌘ rev **1** ⌘ Current version: **5.0.1** ⌘

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

Proposed change affects: ⌘ (U)SIM ME/UE Radio Access Network Core Network

Title:	⌘ Clarification on the use of the Teardown indicator IE		
Source:	⌘ CN4		
Work item code:	⌘ TEI	Date:	⌘ Jan 16, 2002
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: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)

Reason for change:	⌘ The CR 29.060-149 (N4-000941) clarifying the use of Teardown indicator IE was approved in CN4#5 meeting held in Paris. This CR proposed to add following sentence to the definition of the Teardown indicator IE. <i>'This information element shall be included by the SGSN if the Deactivate PDP Context Request message from the MS includes the Teardown indicator at PDP Context Deactivation initiated by MS'</i> The reason for this change was that in above case user clearly shows his intention that he wants to deactivate all PDP contexts (including possible PDP Contexts being activated) associated to the PDP address. On the other hand, in the previous CN4 meeting, it was clarified by the CR 29.060-232 (N4-010980) that there are three cases on the use of the Teardown indicator, i.e. no Teardown indicator, the Teardown indicator with the value '0' and value '1'. As a result, the description on the Teardown indicator was corrected to refer to its value. However above sentence added by the CR 29.060-49 was not changed. This sentence should be also corrected to clarify this is intended for the case where the MS includes the Teardown indicator with the value '1'. Also, an editor change is corrected in the same section.
Summary of change:	⌘ It was clarified that if the MS includes the Teardown indicator with the value '1' in the Deactivate PDP Context Request message, the SGSN copy it as it is to the Delete PDP Context Request.
Consequences if not approved:	⌘ The previous agreement is not correctly implemented. Therefore the SGSN may not proceed with deactivation procedure as the user expects.

Clauses affected:	⌘	7.3.5	
Other specs affected:	⌘	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘
Other comments:	⌘		

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- 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.

7.3.5 Delete PDP Context Request

A Delete PDP Context Request shall be sent from a SGSN node to a GGSN node as part of the GPRS Detach procedure or the GPRS PDP Context Deactivation procedure or from a GGSN node to a SGSN node as part of the PDP Context Deactivation Initiated by GGSN procedure. A request shall be used to deactivate an activated PDP Context or an activated set of PDP contexts associated to a PDP address assigned to a single MS.

A GSN shall be prepared to receive a Delete PDP Context Request at any time and shall always reply regardless if the PDP context exists or not (as per the Delete PDP Context Response message description section), except in cases described below.

If any collision occurs, the Delete PDP Context Request takes precedence over any other Tunnel Management message.

The Teardown Ind is used to indicate whether all PDP contexts that share the PDP address with the PDP context identified in the request should also be deactivated. This may trigger the deletion of all the information kept for a MS at a GSN, if no other PDP contexts associated to other PDP addresses are active on the GSN. ~~This information element shall be included by the SGSN if the Deactivate PDP Context Request message from the MS includes the Tear down indicator at PDP Context Deactivation initiated by MS.~~ If the Teardown Ind information element value is set to '1', then all PDP contexts that share the same PDP address with the PDP context identified by the NSAPI included in the Delete PDP Context Request Message shall be torn down. Only the PDP context identified by the NSAPI included in the Delete PDP context Request shall be torn down if the value of this information element is '0' or this information is not included. The SGSN shall copy this IE to the Delete PDP Context Request from the associated Deactivate PDP Context Request initiated by MS, if it is included. This information element shall NOT be included by the SGSN if the Deactivate PDP Context Request message from the MS does NOT include the Tear down indicator at PDP Context Deactivation initiated by MS. However, ~~exceptionally~~ otherwise this information element shall be included and its value set to '1' by the sending GSN only when the last PDP context associated to a PDP address is torn down and there are no outstanding Create PDP context requests for other PDP context different from the one being torn down for that PDP address.

If a GSN receives a Delete PDP context without a Teardown Indicator or with a Teardown Indicator with value set to '0' and only that PDP context is active for a PDP address, then the GSN shall ignore the message. (Note: This is symptom of a race condition. The reliable delivery of signalling messages will eventually lead to a consistent situation, allowing the teardown of the PDP context.)

The optional Private Extension contains vendor or operator specific information.

Table 11: Information Elements in a Delete PDP Context

Information element	Presence requirement	Reference
Teardown Ind	Conditional	7.7.16
NSAPI	Mandatory	7.7.17
Private Extension	Optional	7.7.44

CHANGE REQUEST

⌘ **23.153** **CR 030** ⌘ rev **2** ⌘ Current version: **4.4.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ME/UE Radio Access Network Core Network

Title:	⌘ Codec fallback in TrFO Call Establishment to External Network		
Source:	⌘ CN4		
Work item code:	⌘ TEI5	Date:	⌘ 1.2..2002
Category:	⌘ C	Release:	⌘ Rel-5
	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: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)

Reason for change:	⌘ A wideband AMR codec is only useful in end to end connections. In TrFO call establishment to external networks which do not support OoBTC procedures transcoding to narrowband voice is done. A codec fallback feature is introduced for that case, so that when the Gateway MSC-Server terminates the OoBTC procedures it shall not select a wideband voice codec to be used in the mobile originating side of the call. Using of wideband voice encoding in that case would result in unnecessary wasting of radio resources in the originating side.
	In the case the external network supports OoBTC procedures this codec fallback to narrowband does not occur, because codec negotiation procedures are possible and enable the interworking of wideband AMR codec with e.g. G.722.2 codec.
Summary of change:	⌘ A text is added to Clause 6.8 stating that when the Gateway MSC-Server terminates the OoBTC procedures it shall not select a wideband voice codec to be used in the mobile originating side of the call.
Consequences if not approved:	⌘ Unnecessary wasting of radio resources in the originating side of the call when the OoBTC procedures are terminated.

Clauses affected:	⌘ 6.8
Other specs affected:	⌘ <input type="checkbox"/> Other core specifications ⌘ <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications
Other comments:	⌘

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.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.

First modified section

6.8 Mobile to External Network TrFO Call Establishment

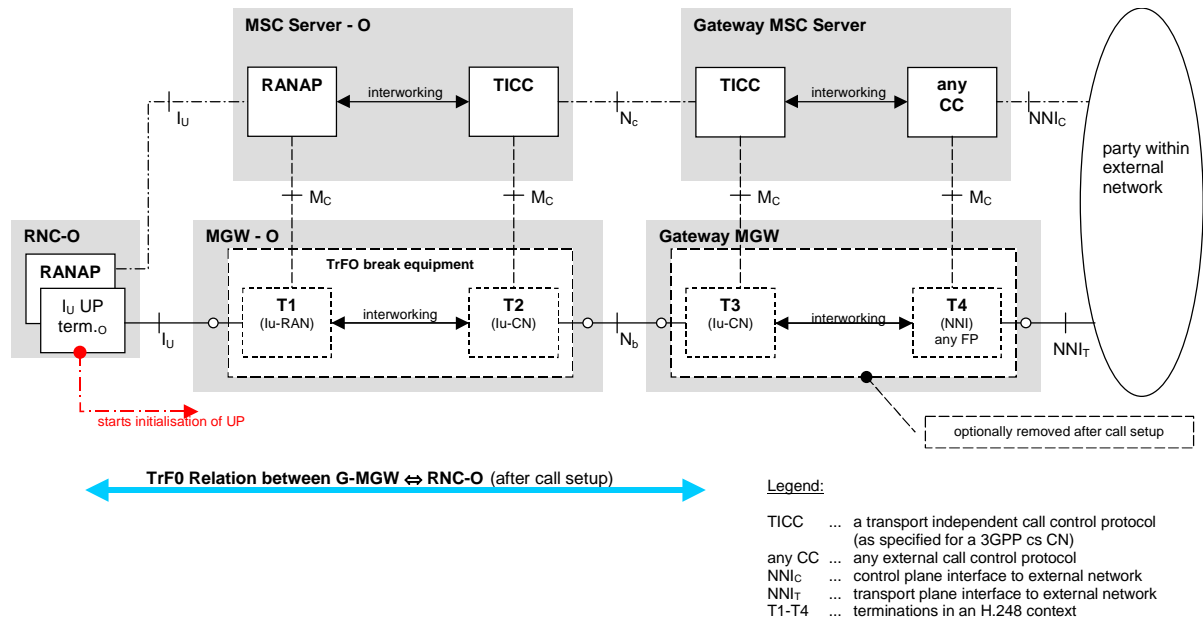


Figure 6.8/1. Configuration during Call Setup of a Mobile to External Network Call.

The description of Figure 6.1/1 (Configuration during Call Setup of a Mobile to Mobile Call) within clause 6.1 applies for the network and protocol entities involved in the External Network to Mobile Call scenario with following modifications:

No RNC-T is present – a party served by an external network is the terminating side of the call instead.

The terminating side CN nodes are Gateway nodes (Gateway MSC Server/Gateway MGW).

The Gateway MGW call context is no TrFO break equipment in general, i.e. T4 in general do not support the IuFP framing protocol. Appropriate interworking (in some cases transcoding) has to be performed between T3 and T4.

Therefore Figures 6.1/2 to 6.1/4. (the respective message flows for mobile to mobile call setup) apply in principle as well with appropriate modifications outlined below:

Codec negotiation

Step 1. Until 6., that give the codec negotiation phase in Figure 6.1/2, shall be applied with following modifications:

There is no terminating UE involved in this negotiation phase.

If the succeeding node of the Gateway MSC-Server doesn't support OoBTC procedures for compressed voice types, the Gateway MSC-Server terminates the OoBTC procedures in order to enable transcoders placement at the edge gateway node. When the Gateway MSC-Server terminates the OoBTC procedures it should not select a wideband voice codec to be used in the mobile originating side of the call.

The edge gateway node shall accept the narrowband voice codec MSC-O prefers and shall not puncture out any codec mode.