3GPP TSG-CN Meeting #22 **NP-030567**
10th - 12th December. Maui, Hawaii.

Source: TSG CN WG3

Title: CRs on Rel-5 Work Item TEI (GPRS).

Agenda item: 8.9

Document for: APPROVAL

Introduction:

This document contains **2** CRs on **Rel-5 Work Item TEI (GPRS),** including the corresponding mirror CRs (as required).

These CRs have been agreed by TSG CN WG3 and are forwarded to TSG CN Plenary meeting for approval.

WG_tdoc	Title	Spec	CR	Rev	Cat	Rel
N3-030776	Disconnect Request for Multiple PDP Sessions belonging to a single User	29.061	094	2	F	Rel-5
N3-030777	Unique IPv6 address for a PDP context	29.061	095	1	F	Rel-5

3GPP TSG-CN WG3 Meeting #29 ***N3-030776***
Sophia Antipolis, France. 25th - 29th August 2003.

CR-Form-v7

CHANGE REQUEST

⌘ **29.061** **CR** **094** ⌘ **rev** **2** ⌘ Current version: **5.7.0** ⌘

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

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

Title:	⌘	Disconnect Request for Multiple PDP Sessions belonging to a single User
Source:	⌘	TSG_CN WG3
Work item code:	⌘	TEI (GPRS)
Date:	⌘	28/10/2003
Category:	⌘	**F**
Release:	⌘	Rel-5

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

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

Reason for change:	⌘	Allow Disconnect Procedures to efficiently handle multiple PDP contexts belonging to a user and sharing the same session.
Summary of change:	⌘	A single user may have a number of PDP contexts active simaltaneously (one primary PDP context and multiple secondary PDP contexts). In order for the AAA Server to disconnect all sessions, a separate disconnect message is currently needed for each PDP session. This adds complexity to the AAA Server and increases the messaging between the AAA Server and the GGSN. Also the GTP Delete PDP Context procedure allows to delete multiple PDP context using the Teardown Indicator Information Element. This Change Request allows a single Disconnect Request message to indicate that all active PDP contexts belonging to the same user and sharing the same user session should be disconnected. This is achieved by adding a new 3GPP VSA to the existing Disconnect Request message called Teardown Indicator, similar to the Information Element used on the Gn interface to delete all the PDP contexts from a single user.
Consequences if not approved:	⌘	Additional messaging and complexity to disconnect multiple PDP contexts belonging to a user.

Clauses affected:	⌘	16.3, 16.4.7, 16.4.9

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	

	X	O&M Specifications

Other comments: ⌘

How to create CRs using this form:

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

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

Change in Clause 2

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] Void.

[2] 3GPP TS 22.060: "General Packet Radio Service (GPRS); Service Description; Stage 1".

[3] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service Description; Stage 2".

[4] Void.

[5] Void.

[6] Void.

[7] Void.

[8] Void.

[9] Void.

[10] 3GPP TS 27.060: "Packet Domain; Mobile Station (MS) supporting Packet Switched services".

[11] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".

[12] Void.

[13] Void.

[14] Void.

[15] IETF RFC 768 (1980): "User Datagram Protocol" (STD 6).

[16] IETF RFC 791 (1981): "Internet Protocol" (STD 5).

[17] IETF RFC 792 (1981): "Internet Control Message Protocol" (STD 5).

[18] IETF RFC 793 (1981): "Transmission Control Protocol" (STD 7).

[19] IETF RFC 1034 (1987): "Domain names - concepts and facilities" (STD 7).

[20] Void.

[21a] IETF RFC 1661 (1994): "The Point-to-Point Protocol (PPP)" (STD 51).

[21b] IETF RFC 1662 (1994): "PPP in HDLC-like Framing".

[22] IETF RFC 1700 (1994): "Assigned Numbers" (STD 2).

[23] 3GPP TS 44.008: "Mobile radio interface layer 3 specification; Core Network protocols; Stage 3".

[24] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp interface".

[25] IETF RFC 2794 (2000): "Mobile IP Network Address Identifier Extension for IPv4", P. Calhoun, C. Perkins.

[26] IETF RFC 2131 (1997): "Dynamic Host Configuration Protocol".

[27] IETF RFC 1542 (1993): "Clarification and Extensions for the Bootstrap Protocol".

[28] IETF RFC 2373 (1998): "IP Version 6 Addressing Architecture".

[29] IETF RFC 2462 (1998): "IPv6 Stateless Address Autoconfiguration".

[30] IETF RFC 2002 (1996): "IP Mobility Support", C. Perkins.

[31] IETF RFC 2486 (1999): "The Network Access Identifier", B. Aboba and M. Beadles.

[32] IETF RFC 1112 (1989): "Host extensions for IP multicasting", S.E. Deering.

[33] IETF RFC 2236 (1997): "Internet Group Management Protocol, Version 2", W. Fenner.

[34] IETF RFC 2362 (1998): "Protocol Independent Multicast-Sparse Mode (PIM-SM): Protocol Specification", D. Estrin, D. Farinacci, A. Helmy, D. Thaler, S. Deering, M. Handley, V. Jacobson, C. Liu, P. Sharma, L. Wei

[35] IETF RFC 1075 (1988): "Distance Vector Multicast Routing Protocol", D. Waitzman, C. Partridge, S.E. Deering.

[36] IETF RFC 1585 (1994): "MOSPF: Analysis and Experience", J. Moy.

[37] IETF RFC 2290 (1998): "Mobile-IPv4 Configuration Option for PPP IPCP", J. Solomon, S. Glass.

[38] IETF RFC 2865 (2000): "Remote Authentication Dial In User Service (RADIUS)", C. Rigney, S. Willens, A. Rubens, W. Simpson.

[39] IETF RFC 2866 (2000): "RADIUS Accounting", C. Rigney, Livingston.

[40] 3GPP TS 23.003: "Numbering, addressing and identification".

[41] IETF RFC ~~2882 (2000): "Network Access Servers Requirements: Extended RADIUS Practices", D. Mitton.~~3576 (2003): "Dynamic Authorization Extensions to Remote Authentication Dial In User Service (RADIUS)", M.Chiba, M.Eklund, D.Mitton, B.Aboba

[42] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[43] Void.

[44] IETF RFC 2461 (1998): "Neighbor Discovery for IP Version 6 (IPv6)", T. Narten, E. Nordmark, W. Simpson

[45] IETF RFC 3118 (2001): "Authentication for DHCP Messages", R. Droms, W. Arbaugh.

[46] IETF Internet-Draft: "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)", draft-ietf-dhc-dhcpv6-28.txt, work in progress.

[47] 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on SIP and SDP"

[48] IETF RFC 2710 (1999): "Multicast Listener Discovery (MLD) for IPv6", S. Deering, W. Fenner, B. Haberman.

[49] IETF RFC 2460 (1998): "Internet Protocol, Version 6 (IPv6) Specification", S.Deering, R.Hinden.

[50] IETF RFC 3162 (2001): "RADIUS and IPv6", B. Adoba, G. Zorn, D. Mitton.

[51] IETF RFC 2548 (1999): "Microsoft Vendor-specific RADIUS Attributes", G.Zorn.

[52] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[53] 3GPP TS 29.207: "Policy control over Go interface".

[54] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network protocols; Stage 3".

[55] Void.

[56] 3GPP TS 29.208: "End to end Quality of Service (QoS) signalling flows".

[57] Void.

[58] IETF RFC 1035 (1987): "Domain names - implementation and specification" (STD 13).

[59] Void.

[60] IETF RFC 1771 (1995): "A Border Gateway Protocol 4 (BGP-4)".

[61] IETF RFC 1825 (1995): "Security Architecture for the Internet Protocol".

[62] IETF RFC 1826 (1995): "IP Authentication Header".

[63] IETF RFC 1827 (1995): "IP Encapsulating Security Payload (ESP)".

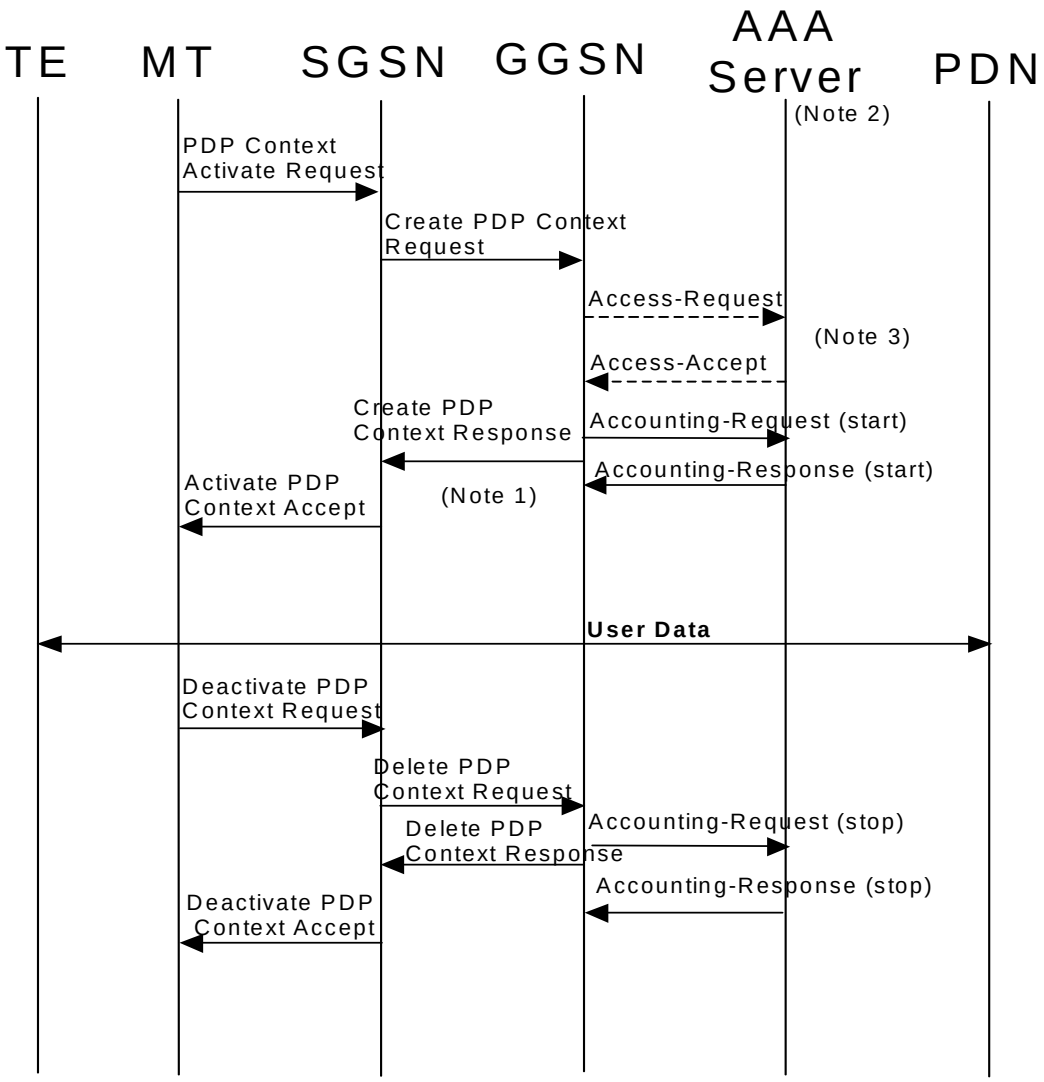
[64] IETF RFC 2044 (1996): "UTF-8, a transformation format of Unicode and ISO 10646".

Change in Clause 16.3

16.3 Authentication and accounting message flows

16.3.1 IP PDP type

Figure 22 represents the RADIUS message flows between a GGSN and an Authentication, Authorization and Accounting (AAA) server.



NOTE 1: If some external applications require RADIUS Accounting request (Start) information before they can process user packets, then the selected APN (GGSN) may be configured in such a way that the GGSN drops user data until the Accounting Response (START) is received from the AAA server. The GGSN may wait for the Accounting Response (START) before sending the CreatePDPContextResponse. The GGSN may reject the PDP context if the Accounting Response (START) is not received.
NOTE 2: Separate accounting and authentication servers may be used.
NOTE 3: The Access-Request message shall be used for primary PDP context only.
NOTE 4: The Accounting-Request (Start) message may be sent at a later stage, e.g. after IPv6 address has been assigned and PDP Context updated, in case of a stateful address autoconfiguration.

Figure 22: RADIUS message flow for PDP type IP (successful user authentication case)

When a GGSN receives a Create PDP Context Request message for a given APN, the GGSN may (depending on the configuration for this APN) send a RADIUS Access-Request to an AAA server. The AAA server authenticates and authorizes the user. If RADIUS is also responsible for IP address or IPv6 prefix allocation the AAA server shall return the allocated IP address or IPv6 prefix in the Access-Accept message.

Even if the GGSN was not involved in user authentication (e.g. transparent network access mode), it may send a RADIUS Accounting-Request START message to an AAA server. This message contains parameters, e.g. the tuple which includes the user-id and IP address or IPv6 prefix, to be used by application servers (e.g. WAP gateway) in order to identify the user. This message also indicates to the AAA server that the user session has started. The session is uniquely identified by the Acct-Session-Id that is composed of the Charging-Id and the GGSN-Address.

If some external applications require RADIUS Accounting request (Start) information before they can process user packets, then the selected APN (GGSN) may be configured in such a way that the GGSN drops user data until the Accounting Response (START) is received from the AAA server. The GGSN may wait for the Accounting Response (START) before sending the CreatePDPContextResponse. The GGSN may reject the PDP context if the Accounting Response (START) is not received. The authentication and accounting servers may be separately configured for each APN.

At a stateful address autoconfiguration, no IP address or IPv6 prefix is available at PDP context activation. In that case the GGSN may wait to send the Accounting-Request START message until the TE receives its IP address in a DHCP-REPLY.

When the GGSN receives a Delete PDP Context Request message and providing a RADIUS Accounting-Request START message was sent previously, the GGSN shall send a RADIUS Accounting-Request STOP message to the AAA server, which indicates the termination of this particular user session. The GGSN shall immediately send a Delete PDP context response, without waiting for an Accounting-Response STOP message from the AAA server.

The AAA server shall deallocate the IP address or IPv6 prefix (if any) initially allocated to the subscriber, if there is no session for the subscriber.

Accounting-Request ON and Accounting-Request OFF messages may be sent from the GGSN to the AAA server to ensure the correct synchronization of the session information in the GGSN and the AAA server.

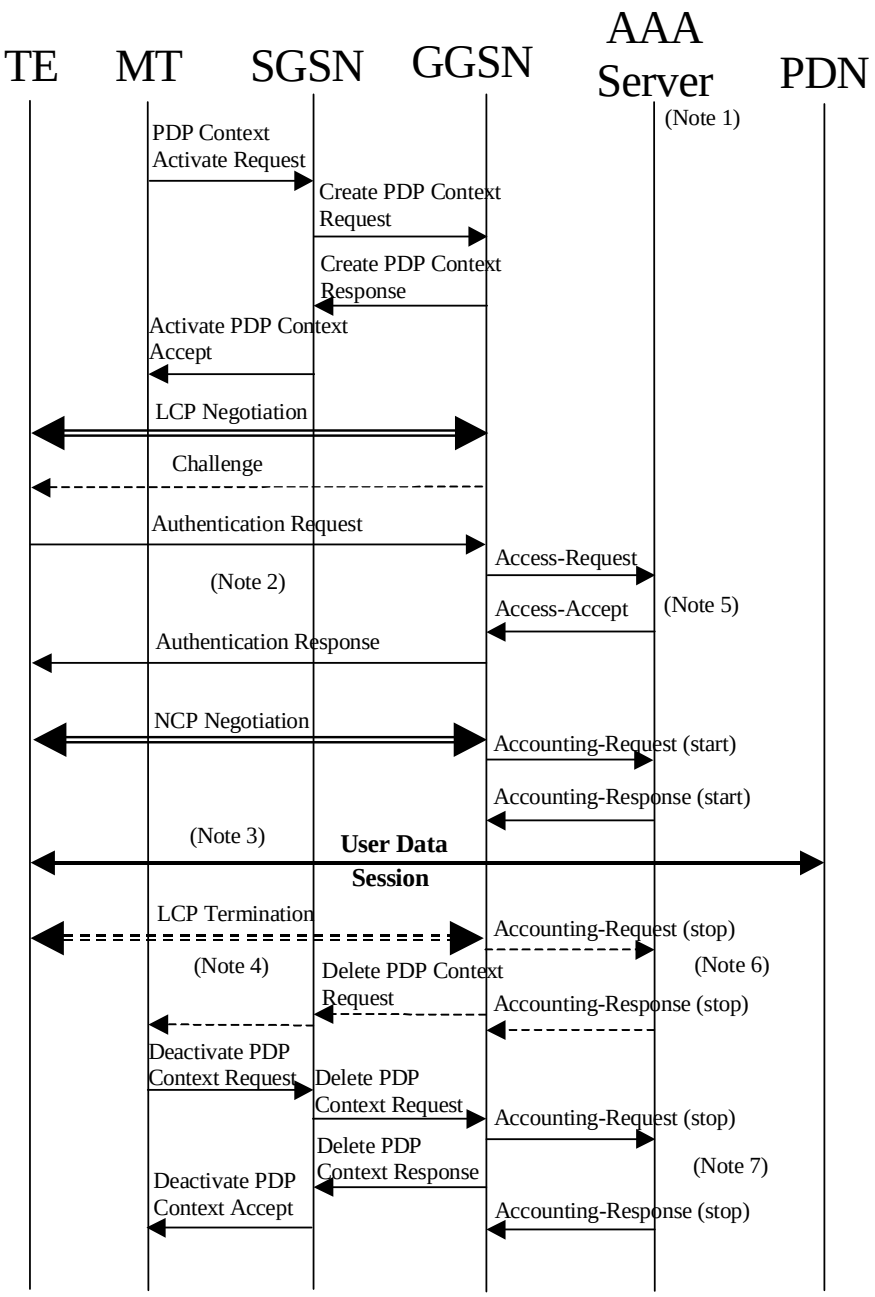
The GGSN may send an Accounting-Request ON message to the AAA server to indicate that a restart has occurred. The AAA server may then release the associated resources.

Prior to a scheduled restart, the GGSN may send Accounting-Request OFF message to the AAA server. The AAA server may then release the associated resources.

If an Access-Challenge is sent to the GGSN when an Access-Request message is pending and when IP PDP type is used, the GGSN shall silently discard the Access-Challenge message and it shall treat an Access-Challenge as though it had received an Access-Reject instead RFC 2865 [38].

16.3.2 PPP PDP type

Figure 23 describes the RADIUS message flows between a GGSN and an Authentication, Authorization and Accounting (AAA) server for the case where PPP is terminated at the GGSN. The case where PPP is relayed to an LNS is beyond the scope of the present document.



NOTE 1: Separate accounting and Authentication servers may be used.
NOTE 2: Actual messages depend on the used authentication protocol (e.g. PAP, CHAP).
NOTE 3: If some external applications require RADIUS Accounting request (Start) information before they can process user packets, then the selected APN (GGSN) may be configured in such a way that the GGSN drops user data until the Accounting Response (START) is received from the AAA server. The GGSN may delete the PDP context if the Accounting Response (START) is not received.
NOTE 4: An LCP termination procedure may be performed. Either the MS or the GGSN may initiate the context deactivation.
NOTE 5: The Access-Request message shall be used for primary PDP context only.
NOTE 6: Network Initiated deactivation.
NOTE 7: User Initiated deactivation.

Figure 23: RADIUS message flow for PDP type PPP (successful user authentication case)

When a GGSN receives a Create PDP Context Request message for a given APN, the GGSN shall immediately send a Create PDP context response back to the SGSN. After PPP link setup, the authentication phase may take place. During Authentication phase, the GGSN sends a RADIUS Access-Request to an AAA server. The AAA server authenticates and authorizes the user. If RADIUS is also responsible for IP address allocation the AAA server shall return the allocated IP address or IPv6 prefix in the Access-Accept message (if the user was authenticated).

If the user is not authenticated, the GGSN shall send a Delete PDP context request to the SGSN.

Even if the GGSN was not involved in user authentication (e.g. for PPP no authentication may be selected), it may send a RADIUS Accounting-Request START message to an AAA server. This message contains parameters, e.g. a tuple which includes the user-id and IP address or IPv6 prefix, to be used by application servers (e.g. WAP gateway) in order to identify the user. This message also indicates to the AAA server that the user session has started, and the QoS parameters associated to the session. The session is uniquely identified by the Acct-Session-Id that is composed of the Charging-Id and the GGSN-Address.

If some external applications require RADIUS Accounting request (Start) information before they can process user packets, then the selected APN (GGSN) may be configured in such a way that the GGSN drops user data until the Accounting Response (START) is received from the AAA server. The GGSN may delete the PDP context if the Accounting Response (START) is not received. The Authentication and Accounting servers may be separately configured for each APN.

When the GGSN receives a Delete PDP Context Request message and providing a RADIUS Accounting-Request START message was sent previously, the GGSN shall send a RADIUS Accounting-Request STOP message to the AAA server, which indicates the termination of this particular user session. The GGSN shall immediately send a Delete PDP context response, without waiting for an Accounting-Response STOP message from the AAA server.

The AAA server shall deallocate the IP address or IPv6 prefix (if any) initially allocated to the subscriber.

Accounting-Request ON and Accounting-Request OFF messages may be sent from the GGSN to the AAA server to ensure the correct synchronization of the session information in the GGSN and the AAA server.

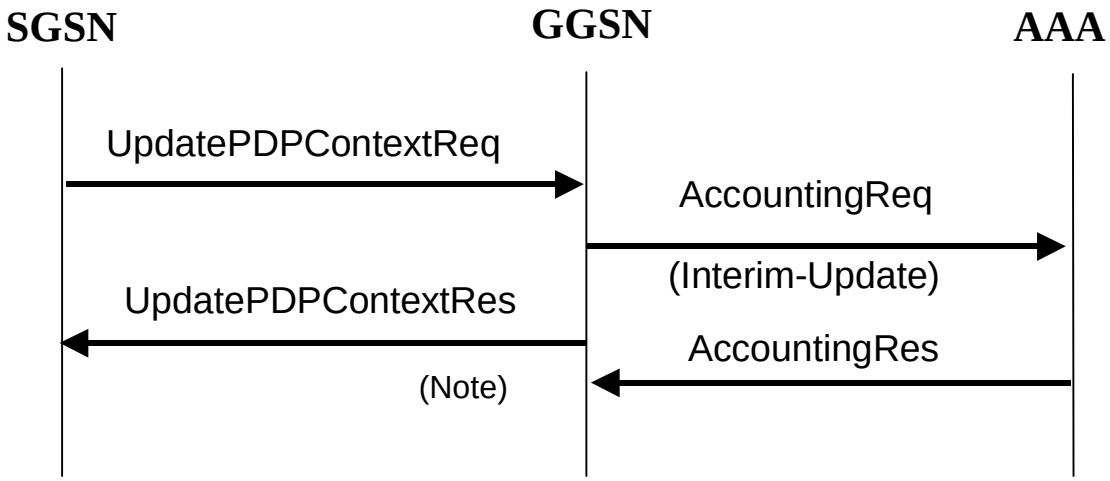
The GGSN may send an Accounting-Request ON message to the AAA server to indicate that a restart has occurred. The AAA server may then release the associated resources.

Prior to a scheduled restart, the GGSN may send Accounting-Request OFF message to the AAA server, the AAA server may then release the associated resources.

If an Access-Challenge is sent to the GGSN when using PPP PDP type, the GGSN shall handle it by PPP CHAP providing PPP CHAP was the selected Authentication protocol. If CHAP authentication was not selected, authentication shall fail RFC 2865 [38].

16.3.3 Accounting Update

During the life of a PDP context some information related to this PDP context may change (i.e. SGSN address if a Inter-SGSN RA update occurs). Upon reception of an UpdatePDPContextRequest from the SGSN, the GGSN may send an Accounting Request Interim-Update to the AAA server to update the necessary information related to this PDP context (see figure 24). In such a case, the GGSN need not wait for the RADIUS AccountingResponse from the AAA server message before sending the UpdatePDPContextResponse to the SGSN. The GGSN may delete the PDP context if the AccountingResponse is not received from the AAA.



NOTE: As shown the GGSN need not wait for the RADIUS AccountingResponse from the AAA server message to send the UpdatePDPContextResponse to the SGSN. The GGSN may delete the PDP context if the AccountingResponse is not received from the AAA.

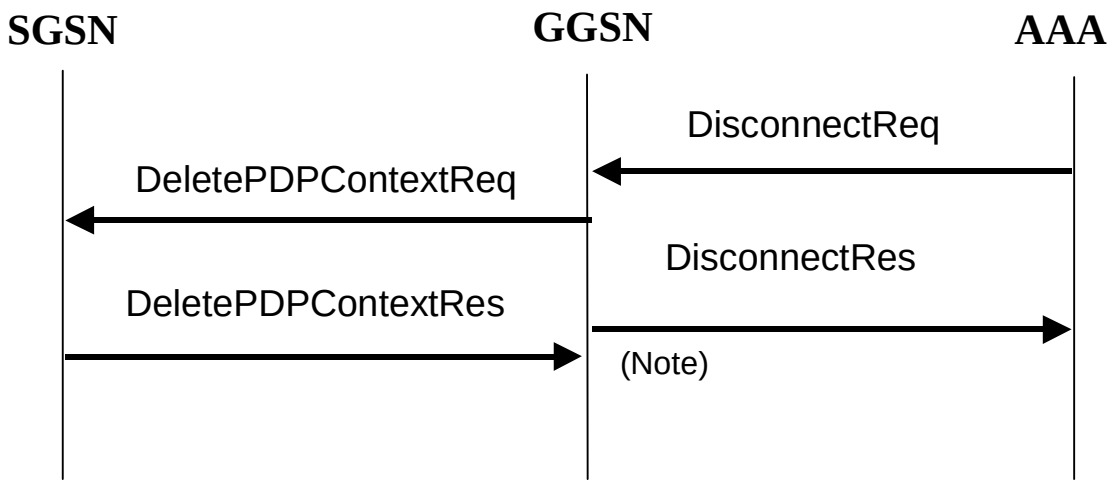
Figure 24: RADIUS for PDP context Update

16.3.4 AAA-Initiated PDP context termination

RADIUS is used as the protocol between the GGSN and an AAA server or proxy for applications (e.g. MMS) to deliver information related to GPRS user session. However some IP applications could need to interwork with the GGSN to terminate a particular PDP context. For this purpose, the AAA server or proxy may send a RADIUS Disconnect Request to the GGSN. As depicted in figure 25, the GGSN may react by deleting the corresponding PDP context or silently discard the Disconnect Request message. For more information on RADIUS Disconnect, see RFC ~~2882~~ 3576 [41]. If the GGSN deletes the corresponding PDP context, it need not wait for the DeletePDPContextResponse from the SGSN before sending the RADIUS DisconnectResponse to the AAA server.

The Teardown-Indicator in the RADIUS Disconnect Request message indicates to the GGSN that all PDP contexts for this particular user and sharing the same user session shall be deleted. The PDP contexts (primary and secondary) are identified by the Acct-Session-Id. The Charging-Id contained in the Acct-Session-Id can be of any primary or secondary PDP contexts of the user. The GGSN is able to find out all the related PDP contexts sharing the same user session once it has found the exact PDP context from the Acct-Session-Id. If a user has the same user IP address for different sets of PDP contexts towards different networks, only the PDP contexts linked to the one identified by the Acct-Session-Id shall be deleted.

Since the Charging-Id contained in the Acct-Session-Id is already sufficient to uniquely identify PDP context(s) for a user session on a GGSN, it has no impact if the user IP address is not known by the GGSN (e.g. in the case of transparent PPP PDP sessions). In this case the user IP address in the Disconnect message should be set to zero (e.g. 0.0.0.0 for IPv4).



NOTE: As showed on figure 25, the GGSN need not wait for the DeletePDPContextResponse from the SGSN to send the RADIUS DisconnectResponse to the AAA server.

Figure 25: PDP Context deletion with RADIUS

Change in Clause 16.4.7

16.4.7 Sub-attributes of the 3GPP Vendor-Specific attribute

Table 7 describes the sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Access-Accept, Accounting-Request START, Accounting-Request STOP, ~~and~~ Accounting-Request Interim-Update and Disconnect-Request messages.

Table 7: ~~The sub-attributes~~List of the 3GPP Vendor-Specific sub-attributes ~~of the Access-Request, Accounting-Request START, Accounting-Request STOP , and Accounting-Request Interim-Update messages~~

Sub-attr #	Sub-attribute Name	Description	Presence Requirement	Associated attribute (Location of Sub-attr)
1	3GPP-IMSI	IMSI for this user	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
2	3GPP-Charging-Id	Charging ID for this PDP Context (this together with the GGSN-Address constitutes a unique identifier for the PDP context).	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
3	3GPP-PDP Type	Type of PDP context, e.g. IP or PPP	Conditional (mandatory if attribute 7 is present)	Access-Request Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
4	3GPP-CG-Address	Charging Gateway IP address	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
5	3GPP-GPRS-Negotiated-QoS-Profile	QoS profile applied by GGSN	Optional	Access-Request, Accounting-Request

Sub-attr #	Sub-attribute Name	Description	Presence Requirement	Associated attribute (Location of Sub-attr)
				START, Accounting-Request STOP, Accounting-Request Interim-Update
6	3GPP-SGSN-Address	SGSN IP address that is used by the GTP control plane for the handling of control messages. It may be used to identify the PLMN to which the user is attached.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
7	3GPP-GGSN-Address	GGSN IP address that is used by the GTP control plane for the context establishment. It is the same as the GGSN IP address used in the GCDRs.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
8	3GPP-IMSI-MCC-MNC	MCC and MNC extracted from the user's IMSI (first 5 or 6 digits, as applicable from the presented IMSI).	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
9	3GPP-GGSN- MCC-MNC	MCC-MNC of the network the GGSN belongs to.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
10	3GPP-NSAPI	Identifies a particular PDP context for the associated PDN and MSISDN/IMSI from creation to deletion.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP Accounting-Request Interim-Update
11	3GPP- Session-Stop-Indicator	Indicates to the AAA server that the last PDP context of a session is released and that the PDP session has been terminated.	Optional	Accounting Request STOP
12	3GPP- Selection-Mode	Contains the Selection mode for this PDP Context received in the Create PDP Context Request Message	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
13	3GPP-Charging-Characteristics	Contains the charging characteristics for this PDP Context received in the Create PDP Context Request Message (only	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update

Sub-attr #	Sub-attribute Name	Description	Presence Requirement	Associated attribute (Location of Sub-attr)
		available in R99 and later releases)		
14	3GPP-CG-IPv6-Address	Charging Gateway IPv6 address	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
15	3GPP-SGSN-IPv6-Address	SGSN IPv6 address that is used by the GTP control plane for the handling of control messages. It may be used to identify the PLMN to which the user is attached.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
16	3GPP-GGSN-IPv6-Address	GGSN IPv6 address that is used by the GTP control plane for the context establishment.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
17	3GPP- IPv6-DNS-Servers	List of IPv6 addresses of DNS servers for an APN	Optional	Access-Accept
18	3GPP-SGSN-MCC-MNC	MCC and MNC extracted from the RAI within the Create PDP Context Request or Update PDP Context Request message.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
19	3GPP-Teardown-Indicator	Indicate to the GGSN that all PDP contexts for this particular user and sharing the same user session need to be deleted.	Optional	Disconnect Request

The RADIUS vendor Attribute is encoded as follows (as per RFC 2865 [38])

Bits

Octets	8	7	6	5	4	3	2	1
1	Type = 26							
2	Length = n							
3	Vendor id octet 1							
4	Vendor id octet 2							
5	Vendor id octet 3							
6	Vendor id octet 4							
7-n	String							

$n \geq 7$

3GPP Vendor Id = 10415

The string part is encoded as follows:

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type =							
2	3GPP Length = m							
3 –m	3GPP value							

m ≥ 2 and m ≤ 248

The 3GPP specific attributes encoding is clarified below.

1 - 3GPP-***IMSI***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 1							
2	3GPP Length= m							
3-m	IMSI digits 1-n (UTF-8 encoded)							

3GPP Type: 1

n ≤15

Length: m ≤ 17

IMSI value: Text:

This is the UTF-8 encoded IMSI; The definition of IMSI shall be in accordance with 3GPP TS 23.003 [40] and 3GPP TS 29.060 [24]. There shall be no padding characters between the MCC and MNC, and between the MNC and MSIN. If the IMSI is less than 15 digits, the padding in the GTP information element shall be removed by the GGSN and not encoded in this sub-attribute.

2 - 3GPP-***Charging ID***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 2							
2	3GPP Length= 6							
3	Charging ID value Octet 1							
4	Charging ID value Octet 2							
5	Charging ID value Octet 3							
6	Charging ID value Octet 4							

3GPP Type: 2

Length: 6

Charging ID value: 32 bits unsigned integer

3 - 3GPP-***PDP type***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 3							
2	3GPP Length= 6							
3	PDP type octet 1							
4	PDP type octet 2							
5	PDP type octet 3							
6	PDP type octet 4							

3GPP Type: 3

Length: 6

PDP type value: Unsigned 32 bits integer

PDP type octet possible values:

0 = IPv4

1 = PPP

2 = IPv6

4 - 3GPP-***Charging Gateway address***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 4							
2	3GPP Length= 6							
3	Charging GW addr Octet 1							
4	Charging GW addr Octet 2							
5	Charging GW addr Octet 3							
6	Charging GW addr Octet 4							

3GPP Type: 4

Length: 6

Charging GW address value: Address

5 - 3GPP-***GPRS Negotiated QoS profile***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 5							
2	3GPP Length= L							
3 -L	UTF-8 encoded QoS profile							

3GPP Type: 5

Length: 27 (release 99) or 11 (release 98)

QoS profile value: Text

UTF-8 encoded QoS profile syntax:

"<Release indicator> – <release specific QoS IE UTF-8 encoding>"

<Release indicator> = UTF-8 encoded number :

"98" = Release 98

"99"= Release 99

<release specific QoS profile UTF-8 encoding> = UTF-8 encoded QoS profile for the release indicated by the release indicator.

The UTF-8 encoding of a QoS IE is defined as follows: each octet is described by 2 UTF-8 encoded digits, defining its hexadecimal representation. The QoS profile definition is in 3GPP TS 24.008 [54].

The release 98 QoS profile data is 3 octets long, which then results in a 6 octets UTF-8 encoded string.

The release 99 QoS profile data is 11 octets long, which results in a 22 octets UTF-8 encoded string.

6 - 3GPP-***SGSN address***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 6							
2	3GPP Length= 6							
3	SGSN addr Octet 1							
4	SGSN addr Octet 2							
5	SGSN addr Octet 3							
6	SGSN addr Octet 4							

3GPP Type: 6

Length: 6

SGSN address value: Address

7 - 3GPP-***GGSN address***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 7							
2	3GPP Length= 6							
3	GGSN addr Octet 1							
4	GGSN addr Octet 2							
5	GGSN addr Octet 3							
6	GGSN addr Octet 4							

3GPP Type: 7

Length: 6

GGSN address value: Address

8 - 3GPP-***IMSI MCC-MNC***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 8							
2	3GPP Length= n							
3	MCC digit1 (UTF-8 encoded)							
4	MCC digit2 (UTF-8 encoded)							
5	MCC digit3 (UTF-8 encoded)							
6	MNC digit1 (UTF-8 encoded)							
7	MNC digit2 (UTF-8 encoded)							
8	MNC digit3 if present (UTF-8 encoded)							

3GPP Type: 8

Length: n shall be 7 or 8 octets depending on the presence of MNC digit 3

MS address value: text

This is the UTF-8 encoding of the MS MCC-MNC values. In accordance with 3GPP TS 23.003 [40] and 3GPP TS 29.060 [24] the MCC shall be 3 digits and the MNC shall be either 2 or 3 digits. There shall be no padding characters between the MCC and MNC.

9 - 3GPP-***GGSN MCC-MNC***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 9							
2	3GPP Length= n							
3	MCC digit1 (UTF-8 encoded)							
4	MCC digit2 (UTF-8 encoded)							
5	MCC digit3 (UTF-8 encoded)							
6	MNC digit1 (UTF-8 encoded)							
7	MNC digit2 (UTF-8 encoded)							
8	MNC digit3 if present (UTF-8 encoded)							

3GPP Type: 9

Length: n shall be 7 or 8 octets depending on the presence of MNC digit 3

GGSN address value: text

This is the UTF-8 encoding of the GGSN MCC-MNC values. In accordance with 3GPP TS 23.003 [40] and 3GPP TS 29.060 [24] the MCC shall be 3 digits and the MNC shall be either 2 or 3 digits. There shall be no padding characters between the MCC and MNC.

10 - 3GPP-***NSAPI***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 10							
2	3GPP Length= 3							
3	NSAPI							

3GPP Type: 10

Length: 3

NSAPI value: text

It is the value of the NSAPI of the PDP context the RADIUS message is related to. It is encoded as its hexadecimal representation, using 1UTF-8 encoded digit.

11 - 3GPP-***Session Stop Indicator***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 11							
2	3GPP Length= 3							
3	1 1 1 1 1 1 1 1							

3GPP Type: 11

Length: 3

Value is set to all 1.

12 - 3GPP-***Selection-Mode***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 12							
2	3GPP Length= 1							
3	UTF-8 encoded Selection mode string							

3GPP Type: 12

Length: 3

Selection mode value: Text

The format of this attribute shall be a character string consisting of a single digit, mapping from the binary value of the selection mode in the Create PDP Context message (3GPP TS 29.060 [24]). Where 3GPP TS 29.060 [24] provides for interpretation of the value, e.g. map '3' to '2', this shall be done by the GGSN.

13 - 3GPP-***Charging-Characteristics***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 13							
2	3GPP Length= 6							
3-6	UTF-8 encoded Charging Characteristics value							

3GPP Type: 13

Length: 6

Charging characteristics value: Text

The charging characteristics is value is the value of the 2 octets value field taken from the GTP IE described in 3GPP TS 29.060 [24], subclause 7.7.23.

Each octet of this IE field value is represented via 2 UTF-8 encoded digits, defining its hexadecimal representation.

14 - 3GPP-***Charging Gateway IPv6 address***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 14							
2	3GPP Length= 18							
3	Charging GW IPv6 addr Octet 1							
4	Charging GW IPv6 addr Octet 2							
5-18	Charging GW IPv6 addr Octet 3-16							

3GPP Type: 14

Length: 18

Charging GW IPv6 address value: IPv6 Address

15 - 3GPP-***SGSN IPv6 address***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 15							
2	3GPP Length= 18							
3	SGSN IPv6 addr Octet 1							
4	SGSN IPv6 addr Octet 2							
5-18	SGSN IPv6 addr Octet 3-16							

3GPP Type: 15

Length: 18

SGSN IPv6 address value: IPv6 Address

16 - 3GPP-***GGSN IPv6 address***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 16							
2	3GPP Length= 18							
3	GGSN IPv6 addr Octet 1							
4	GGSN IPv6 addr Octet 2							
5-18	GGSN IPv6 addr Octet 3-16							

3GPP Type: 16

Length: 18

GGSN IPv6 address value: IPv6 Address

17 - 3GPP-***IPv6-DNS-Servers***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 17							
2	3GPP Length= m							
3-18	(1st) DNS IPv6 addr Octet 1-16							
19-34	(2nd) DNS IPv6 addr Octet 1-16							
k-m	(n-th) DNS IPv6 addr Octet 1-16							

3GPP Type: 17

Length: $m = n \times 16 + 2$; $n \geq 1$ and $n \leq 15$; $k = m-15$

IPv6 DNS Server value: IPv6 AddressThe 3GPP- IPv6-DNS-Servers Attribute provides a list of one or more ('n') IPv6 addresses of Domain Name Server (DNS) servers for an APN. The DNS servers are listed in the order of preference for use by a client resolver, i.e. the first is 'Primary DNS Server', the second is 'Secondary DNS Server' etc. The attribute may be included in Access-Accept packets.

18 - 3GPP-***SGSN MCC-MNC***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 18							
2	3GPP Length= n							
3	MCC digit1 (UTF-8 encoded)							
4	MCC digit2 (UTF-8 encoded)							
5	MCC digit3 (UTF-8 encoded)							
6	MNC digit1 (UTF-8 encoded)							
7	MNC digit2 (UTF-8 encoded)							
8	MNC digit3 if present (UTF-8 encoded)							

3GPP Type: 18

Length: n shall be 7 or 8 octets depending on the presence of MNC digit 3

SGSN address value: text

This is the UTF-8 encoding of the RAI MCC-MNC values. In accordance with 3GPP TS 23.003 [40] and 3GPP TS 29.060 [24] the MCC shall be 3 digits and the MNC shall be either 2 or 3 digits. There shall be no padding characters between the MCC and MNC.

19 - 3GPP-***Teardown Indicator***

Octets	Bits 8	7	6	5	4	3	2	1
1	3GPP type = 19							
2	3GPP Length= 3							
3	spare							TI

3GPP Type: 19

Length: 3

If the value of TI is set to "1"', then all PDP contexts that share the same user session 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 TI is "0".

Change in Clause 16.4.9

16.4.9 Disconnect Request (optionally sent from AAA server to GGSN)

Table 9 describes the attributes of the Disconnect-Request message.

Table 9: The attributes of the Disconnect-Request message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username provided by the user (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used). If no username is available a generic username, configurable on a per APN basis, shall be present. If the User-Name has been sent in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
8	Framed-IP-Address	User IP address	IPv4	Conditional Note 2
97	Framed-IPv6-Prefix	User IPv6 address	IPv6	Conditional Note 2
96	Framed-Interface-Id	User IPv6 Interface Identifier	IPv6	Conditional Notes 1and 2
44	Acct-Session-Id	User session identifier.	GGSN IP address (IPv4 or IPv6) and Charging-ID concatenated in a UTF-8 encoded hexadecimal. (Note 3)	Mandatory

26/10415	3GPP Vendor-Specific	Sub-attributes according to subclause 16.4.7.	See subclause 16.4.7	Optional

NOTE 1: Included if the prefix alone is not unique for the user. This may be the case, for example, if address is assigned using stateful address autoconfiguration or if a static IPv6 address.
NOTE 2: Either IPv4 or IPv6 address/prefix attribute shall be present. See subclause 16.3.4.
NOTE 3: The GGSN IP address is the same as that used in the GCDRs.

End of Changes

3GPP TSG-CN WG3 Meeting #30 **N3-030777**
Bangkok, Thailand. 27th - 31st October 2003.

CR-Form-v7

CHANGE REQUEST

⌘ **29.061** **CR** **095** ⌘ **rev** **1** ⌘ Current version: **5.7.0** ⌘

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

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

Title:	⌘	Unique IPv6 address for a PDP context
Source:	⌘	TSG_CN WG3
Work item code:	⌘	TEI (GPRS) ***Date:*** ⌘ 31/10/2003
Category:	⌘	**F** ***Release:*** ⌘ Rel-5

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

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

Reason for change:	⌘	GPRS procedures assume that a PDP context has a unique IP address/prefix. According to RFC 3315, a DHCPv6 server may assign several IPv6 addresses to a single Identity Association (IA). Furthermore, an MS may send a REQUEST that contains more than one IA option or an MS may send additional REQUESTs for a PDP context that already has an address. This implies that the DHCPv6 server potentially may assign a number of addresses although only one address can be used. Today, the handling of this is not specified in the DHCP server and the GGSN .
Summary of change:	⌘	In the procedure for stateful IPv6 address autoconfiguration, it is clarified that the DHCPv6 server shall only return one address per IA option. It is also stated that if the MS requests additional addresses, then the request is rejected by the GGSN.
Consequences if not approved:	⌘	Undefined network behaviour if several addresses are requested per PDP context.

Clauses affected:	⌘	13.2.1.2

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

Other comments:	⌘	

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

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

First Modified Section

13.2.1.2 Address allocation using DHCPv6

The following description bullet items describe the signal flow. For a detailed description of the DHCPv6 messages refer to the DHCPv6 IETF Internet-Draft [46]. In the context of IPv6, address allocation through DHCP is also referred to as Stateful Address Autoconfiguration. The end-to-end protocol configuration is depicted in figure 16e.

The PDP Context activation part and the initial Router Advertisement that triggers the MS to do the Stateful Address Autoconfiguration is described in subclause "IPv6 Non Transparent access to an Intranet or ISP".

1) The TE sends a SOLICIT message with the IP destination address set to the All_DHCP_Relay_Agents_and_Servers multicast address defined in the DHCPv6 IETF Internet-Draft [46]. The source address is the link local address created by the MS. The SOLICIT message shall contain exactly one IA option.

2) The GGSN creates a RELAY-FORWARD message. The "Client-Message" option shall include the entire SOLICIT message. The GGSN sends the message to the DHCP server(s) configured for the APN using unicast addresses or All_DHCP_Servers multicast address. More details on the parameters for the RELAY-FORWARD are found in the DHCPv6 IETF Internet-Draft [46]. The GGSN may store a PDP Context ID in the Interface-Id option if this aids it in handling the Relay-Reply (the DHCP server will echo the Interface-Id option).

3) DHCP servers receiving the RELAY-FORWARD message including the SOLICIT request reply by sending a RELAY-REPLY message. The "Server-Message" option includes the ADVERTISE message with an offered IP address.

4) GGSN extracts the ADVERTISE messages and forwards the messages to the proper MS.

5) The TE chooses one of the possibly several ADVERTISE messages and sends a REQUEST confirming its choice and requesting additional configuration information. The REQUEST message shall contain exactly one IA option.

6) GGSN embeds the REQUEST in the "Client-Message" option of the RELAY-FORWARD and sends it as explained in step 2.

7) The selected DHCP server receives the RELAY-FORWARD and replies with a RELAY-REPLY. The "Server-Message" option includes the REPLY message containing the configuration information requested by the TE.

8) The GGSN extracts the REPLY message and forwards it to the proper MS. GGSN also extracts IA option information such as the allocated MS IPv6 address and its lifetime and stores it in the corresponding PDP context. The GGSN shall silently discard any Neighbour Solicitation message sent by the MS to perform Duplicate Address Detection (see 3GPP TS 23.060 [3]).

9) The GGSN initiates a PDP context modification procedure by sending an Update PDP Context Request to the appropriate SGSN with the End User Address information element set to the allocated IPv6 address.

10) The SGSN sends a Modify PDP Context Request to the MT with the allocated IPv6 address in the PDP Address information element.

11) The MT acknowledges by sending a Modify PDP Context Accept to the SGSN.

12) The SGSN sends an Update PDP Context Response to the GGSN. The PDP context has been successfully updated with the allocated IPv6 address.

13) In the Stateful Address Autoconfiguration, Router Advertisements sent by GGSN on the MS-GGSN link shall not contain any Prefix Information option, even when GGSN has knowledge of the Prefix of the MS through the DHCP relay agent. The Prefix need not be advertised since the MS is the only host on the link and Stateless Address Autoconfiguration shall not be performed concurrently to Stateful Address Autoconfiguration.

The DHCPv6 server shall be configured to return exactly one address per IA option. If the request from the MS contains more than one IA option or if an MS sends additional REQUESTs for a PDP context that already has an address, the GGSN shall reject the request and return the status code "UnspecFail" (see IETF RFC3315 [46]) to the MS.

EXAMPLE: In the following example a successful PDP context activation with use of DHCPv6 from end to end is shown.

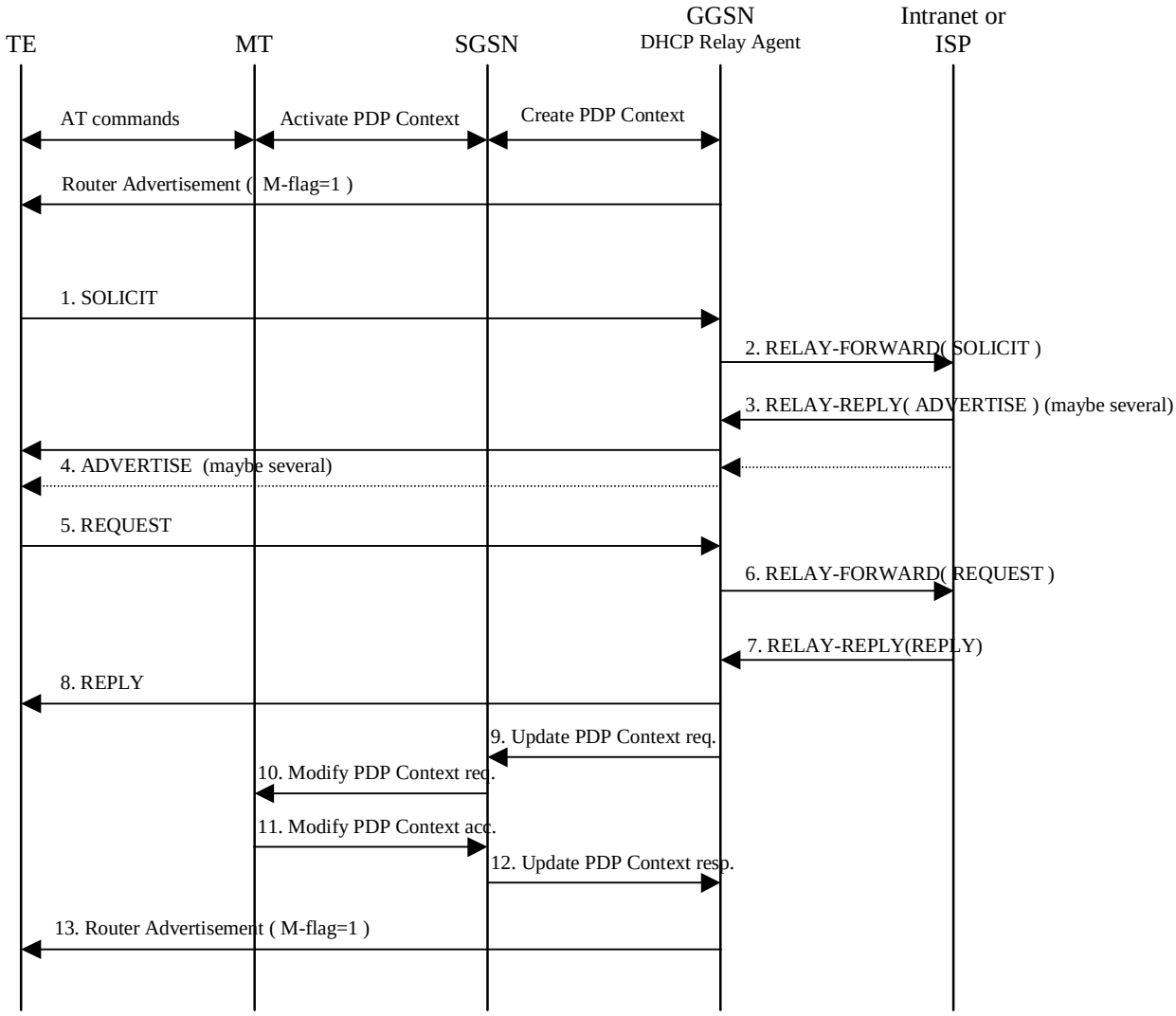


Figure 16e: DHCPv6 signal flow

End of modifications