3GPP TSG CN Plenary Meeting #14 **Tdoc NP-010672**
Kyoto, Japan. 12th - 14th December 2001.

Source: **TSG CN WG3**

Title: **CRs on <R99 Work Item GPRS**

Agenda item: **7.12**

Document for: **APPROVAL**

Introduction:

This document contains **8** CRs on **<R99** Work Item **"GPRS"**, that have been agreed by TSG CN WG3, and are presented to TSG CN Plenary meeting #14 for approval.

NP Tdoc	WG Tdoc	Subject	Spec	CR	R.	Cat	Ph.	C_Ver	WI
NP-010572	N3-010478	Standard method for interworking between GPRS and external PDN using RADIUS	09.61	A030		F	R97	6.5.0	GPRS
NP-010572	N3-010477	Standard method for interworking between GPRS and external PDN using RADIUS	09.61	A029		A	R98	7.4.0	GPRS
NP-010572	N3-010476	Standard method for interworking between GPRS and external PDN using RADIUS	29.061	033		A	R99	3.7.0	GPRS
NP-010572	N3-010475	Standard method for interworking between GPRS and external PDN using RADIUS	29.061	024	2	A	Rel-4	4.2.0	GPRS
NP-010572	N3-010474	Standard method for updating information between GPRS and external PDN using RADIUS	09.61	A027		F	R97	6.5.0	GPRS
NP-010572	N3-010473	Standard method for updating information between GPRS and external PDN using RADIUS	09.61	A028		A	R98	7.4.0	GPRS
NP-010572	N3-010472	Standard method for updating information between GPRS and external PDN using RADIUS	29.061	034		A	R99	3.7.0	GPRS
NP-010572	N3-010471	Standard method for updating information between GPRS and external PDN using RADIUS	29.061	023	2	A	Rel-4	4.2.0	GPRS

3GPP TSG-CN WG3 Meeting #19
Brighton, U.K. 15th - 19th September 2001

Tdoc N3-010471

CR-Form-v4

CHANGE REQUEST

⌘ **29.061** **CR** **023** ⌘ ev **2** ⌘ Current version: **4.2.0** ⌘

*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 **X**

Title:	⌘	Standard method for information update between GPRS and external PDN using RADIUS
Source:	⌘	CN3
Work item code:	⌘	GPRS
Date:	⌘	19.10.2001
Category:	⌘	**A**
Release:	⌘	REL-4

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)

Reason for change:	⌘	When using RADIUS on the Gi interface, several information related to the PDP context are sent from the GGSN to AAA server using the RADIUS protocol. During the life of a PDP context some of those information may be updated (e.g. SGSN address). To avoid inconsistencies between the AAA server and the GPRS network, any information changed in a PDP context should also be updated in the AAA.
Summary of change:	⌘	This CR proposes to use RADIUS Accounting to update the information related to a PDP context, when this PDP contex is being updated.
Consequences if not approved:	⌘	Inconsistencies between the SGSN, GGSN and AAA server

Clauses affected:	⌘	16		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘	CR 028 should be implemented on top of this CR.		

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.

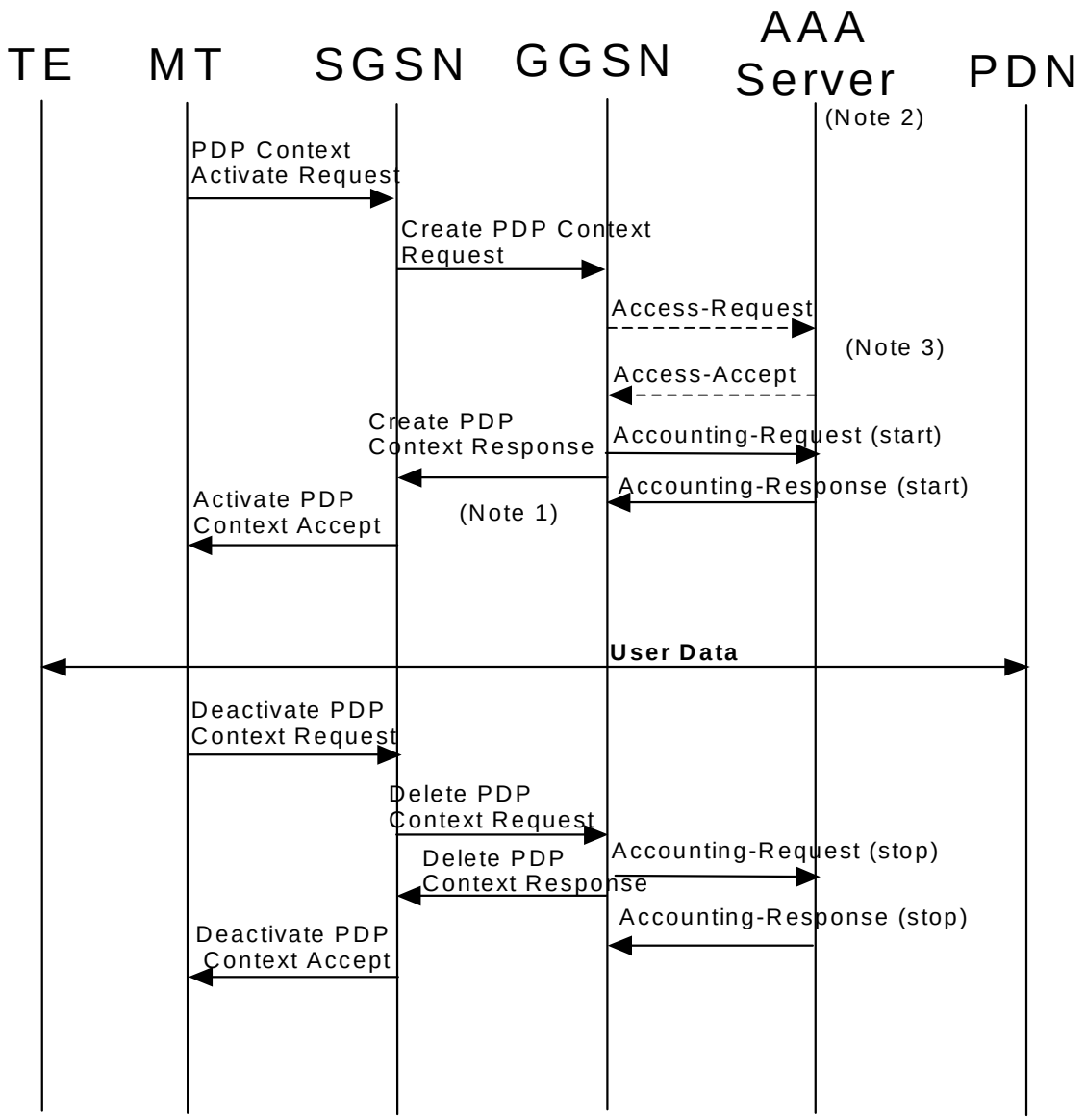
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest 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.

16.3 Authentication and accounting message flows

16.3.1 IP PDP type

The figure 14 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. Both Authentication and Accounting servers may be optional and separately configured for each APN.

NOTE 2: Separate accounting and authentication servers may be used.

NOTE 3: The Access-Request message shall be used for primary PDP context only.

Figure 14: 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 allocation the AAA server shall return the allocated IP address 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, 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. User data forwarding at the GGSN may not be allowed before the Accounting Response START is received. If this is the case, the GGSN drops user data until the Accounting Response START is received. This is configurable per 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 (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.

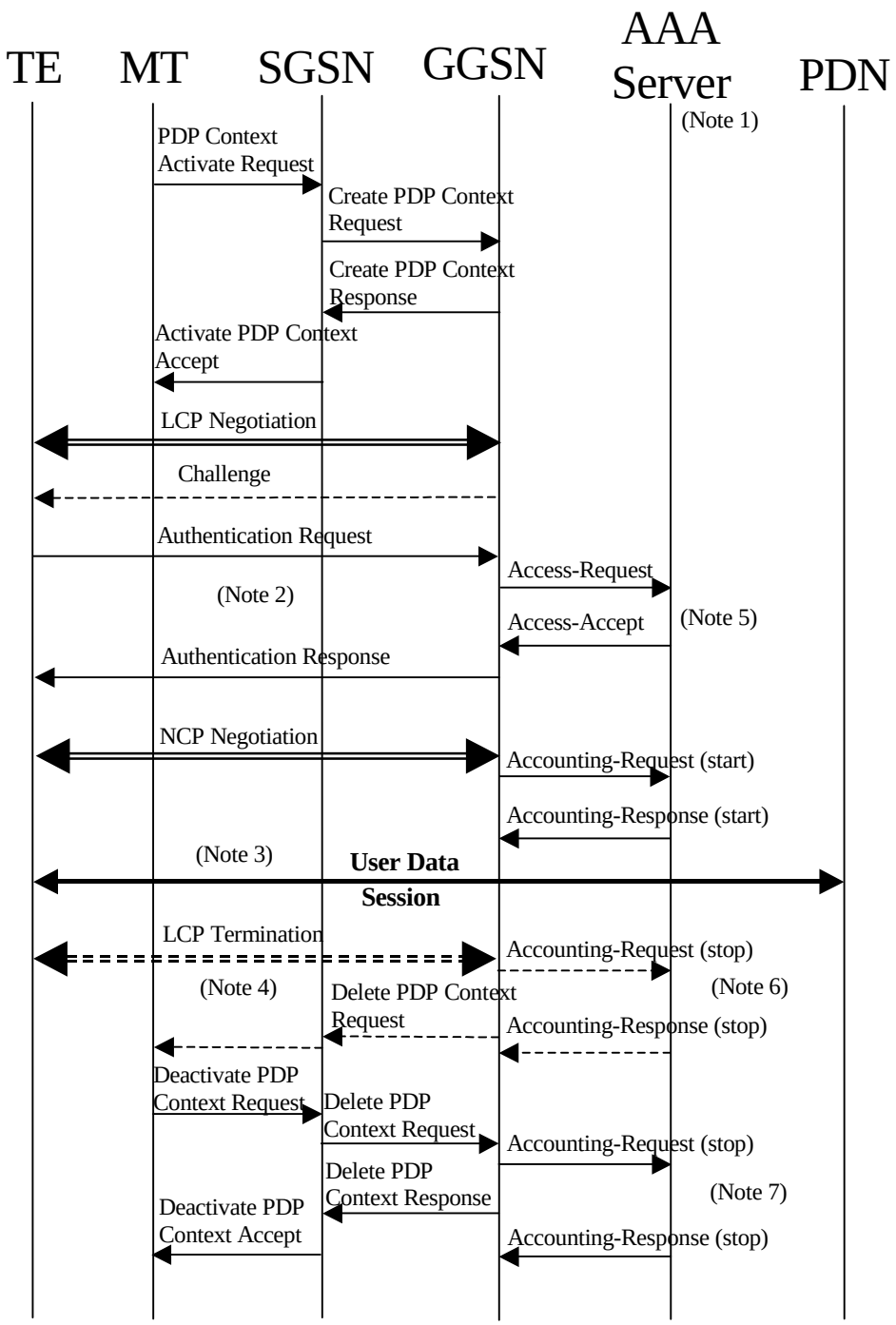
The GGSN may send an Accounting-Request ON message to the AAA server to indicate that a restart has occurred. The AAA server may then release the associated resources.

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 [38].

16.3.2 PPP PDP type

The figure 15 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 this specification.



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: User data may not be allowed before the Accounting Response (START) is received. If this is the case, the GGSN drops user data until the Accounting Response (START) is 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 15: 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 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, 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.

User data forwarding at the GGSN may not be allowed before the Accounting Response START is received. If this is the case, the GGSN drops user data until the Accounting Response START is received. This is configurable per 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 (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 [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 16).

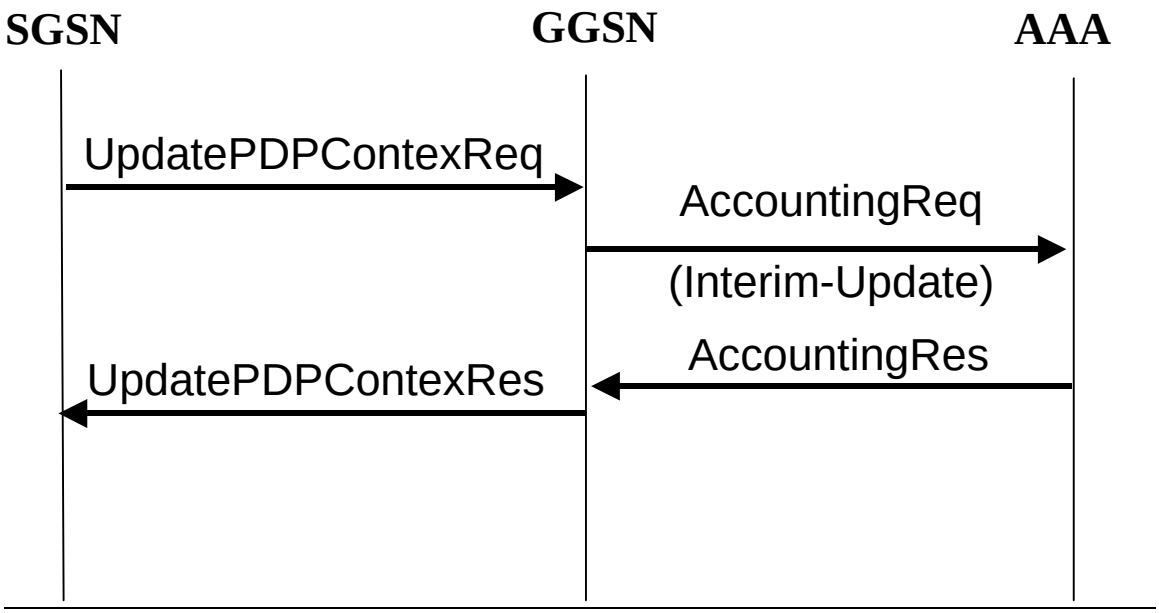


Figure 16: RADIUS for PDP context Update

16.4 List of RADIUS attributes

The following tables describe the actual content of the RADIUS messages exchanged between the GGSN and the AAA server. Other RADIUS attributes may be used as defined in RADIUS RFC(s). Unless otherwise stated, when the encoding scheme of an attribute is specified as UTF-8 encoding, this shall be interpreted as UTF-8 hexadecimal encoding.

16.4.1 Access-Request message (sent from the GGSN to AAA server)

The table 1 describes the attributes of the Access-Request message.

Table 1: The attributes of the Access-Request message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username is provided by the user (extracted from the Protocol Configuration Options (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.	String	Mandatory
2	User-Password	User password provided by the user if PAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used). If no password is available a generic password, configurable on a per APN basis, shall be present.	String	Conditional Note 1
3	CHAP-Password	User password provided by the user if CHAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used).	String	Conditional Note 2
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed-Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	IP address allocated for this user	IPv4	Conditional
9	Framed-IP-Netmask	Netmask for the user IP address	IPv4	Conditional
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded decimal. Note that there are no leading characters in front of the country code.	Mandatory
60	CHAP-Challenge	Challenge if CHAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used).	String	Conditional Note 2
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according sub-clause 16.4.8~~7~~	See sub-clause 16.4.8~~7~~	Optional except sub-attribute 3 which is conditional

NOTE 1: Shall be present if PAP is used.

NOTE 2: Shall be present if CHAP is used.

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

16.4.2 Access-Accept (sent from AAA server to GGSN)

The table 2 describes the attributes of the Access-Accept message.

Table 2: The attributes of the Access-Accept message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username received in the Access-Request message or a substitute username provided by the AAA server. If the User-Name has been received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed-Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	IP address allocated for this user, if the AAA server is used to allocate IP address.	IPv4	Conditional
9	Framed-IP-Netmask	Netmask for the user IP address, if the AAA server is used to allocate IP netmask.	IPv4	Conditional
12	Framed-IP-MTU	MTU for the user towards this particular APN, MTU shall be less or equal to 1500	String	Optional
25	Class	Identifier to be used in all subsequent accounting messages.	String	Optional (NOTE 4)
27	Session-Timeout	Indicates the timeout value (in seconds) for the user session	32 bit unsigned Integer	Optional
28	Idle-Timeout	Indicates the timeout value (in seconds) for idle user session	32 bit unsigned Integer	Optional
26/311	MS- primary-DNS-server	Contains the primary DNS server address for this APN	Ipv4	Optional
26/311	MS-Secondary-DNS-Server	Contains the secondary DNS server address for this APN	IPv4	Optional
26/311	MS-Primary-NBNS-Server	Contains the primary NetBios name server address for this APN	IPv4	Optional
26/311	MS-Secondary-NBNS-Server	Contains the secondary NetBios server address for this APN	IPv4	Optional
NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message				

16.4.3 Accounting-Request START (sent from GGSN to AAA server)

The table 3 describes the attributes of the Accounting-Request START message.

Table 3: The attributes of the Accounting-Request START 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 received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
4	NAS-IP-Address	GGSN IP address for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional

8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Conditional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded decimal. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Type of accounting message	START	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time (in seconds) of the event generating this Accounting-Request.	32 unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according sub-clause 16.4.8~~7~~.	See sub-clause 16.4.8~~7~~	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.4 Accounting Request STOP (sent from GGSN to AAA server)

The table 4 describes the attributes of the Accounting-Request STOP message.

Table 4: The attributes of the Accounting-Request STOP 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 received in the Access-Accept message, this user-name shall be used in preference to the	String	Optional

		above		
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Optional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Indicates the type of accounting request	STOP	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time of the event generating this Accounting-Request	Second	Optional
42	Acct-Input-Octets	GGSN counted number of octets sent by the user for the PDP context	32 bit unsigned integer	Optional
43	Acct-Output-Octets	GGSN counted number of octets received by the user for the PDP context	32 bit unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
46	Acct-Session-Time	Duration of the session	Second	Optional
47	Acct-Input-Packets	GGSN counted number of packets sent by the user	Packet	Optional
48	Acct-Output-Packets	GGSN counted number of packets received by the user	Packet	Optional
49	Acct-Terminate-Cause	Indicate how the session was terminated	See RFC 2866	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according to sub-clause 16.4.~~7~~8.	See sub-clause 16.4.~~7~~8	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.5 Accounting Request ON (optionally sent from GGSN to AAA server)

The table 5 describes the attributes of the Accounting-Request ON message.

Table 5: The attributes of the Accounting-Request ON message

Attr #	Attribute Name	Description	Content	Presence Requirement
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
30	Called-Station-ID	Identifier for the target network.	APN (UTF-8 encoded)	Optional
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.				

16.4.6 Accounting Request OFF (optionally sent from GGSN to AAA server)

The table 6 describes the attributes of the Accounting-Request OFF message.

Table 6: The attributes of the Accounting-Request OFF message

Attr #	Attribute Name	Description	Content	Presence Requirement
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
30	Called-Station-ID	Identifier for the target network.	APN (UTF-8 encoded)	Optional
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.				

16.4.7 Accounting Request Interim-Update (sent from GGSN to AAA server)

The table 7 describes the attributes of the Accounting-Request Interim-Update message.

Table 7: The attributes of the Accounting-Request Interim-Update 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 received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with	String	Conditional

		the AAA server.		Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Optional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Indicates the type of accounting request	Interim-Update	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time of the event generating this Accounting-Request	Second	Optional
42	Acct-Input-Octets	GGSN counted number of octets sent by the user for the PDP context	32 bit unsigned integer	Optional
43	Acct-Output-Octets	GGSN counted number of octets received by the user for the PDP context	32 bit unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
46	Acct-Session-Time	Duration of the session	Second	Optional
47	Acct-Input-Packets	GGSN counted number of packets sent by the user	Packet	Optional
48	Acct-Output-Packets	GGSN counted number of packets received by the user	Packet	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according to sub-clause 16.4.7.	See sub-clause 16.4.8	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.8~~7~~ Sub-attributes of the 3GPP Vendor-Specific attribute

The table ~~7~~ 8 describes the sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START and Accounting-Request STOP message.

Table ~~7~~8: The sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START and Accounting-Request STOP message

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-QoS-Profile	QoS profile received	Optional	Access-Request, Accounting-Request 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, Access-Request STOP, Accounting-Request Interim-Update
11	3GPP- Session-Stop-Indicator	Indicateds 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 available in R99 and later releases)	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update

3GPP TSG-CN WG3 Meeting #19
Brighton, U.K. 15th - 19th September 2001

Tdoc N3-010472

CR-Form-v4

CHANGE REQUEST

⌘ **29.061** **CR** **034** ⌘ ev **-** ⌘ Current version: **3.7.0** ⌘

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

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

Title:	⌘	Standard method for information update between GPRS and external PDN using RADIUS
Source:	⌘	CN3
Work item code:	⌘	GPRS
Date:	⌘	19.10.2001
Category:	⌘	**A**
Release:	⌘	R99

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)

Reason for change:	⌘	When using RADIUS on the Gi interface, several information related to the PDP context are sent from the GGSN to AAA server using the RADIUS protocol. During the life of a PDP context some of those information may be updated (e.g. SGSN address). To avoid inconsistencies between the AAA server and the GPRS network, any information changed in a PDP context should also be updated in the AAA.
Summary of change:	⌘	This CR proposes to use RADIUS Accounting to update the information related to a PDP context, when this PDP contex is being updated.
Consequences if not approved:	⌘	Inconsistencies between the SGSN, GGSN and AAA server

Clauses affected:	⌘	16		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘	CR 027 should be implemented on top of this CR.		

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.

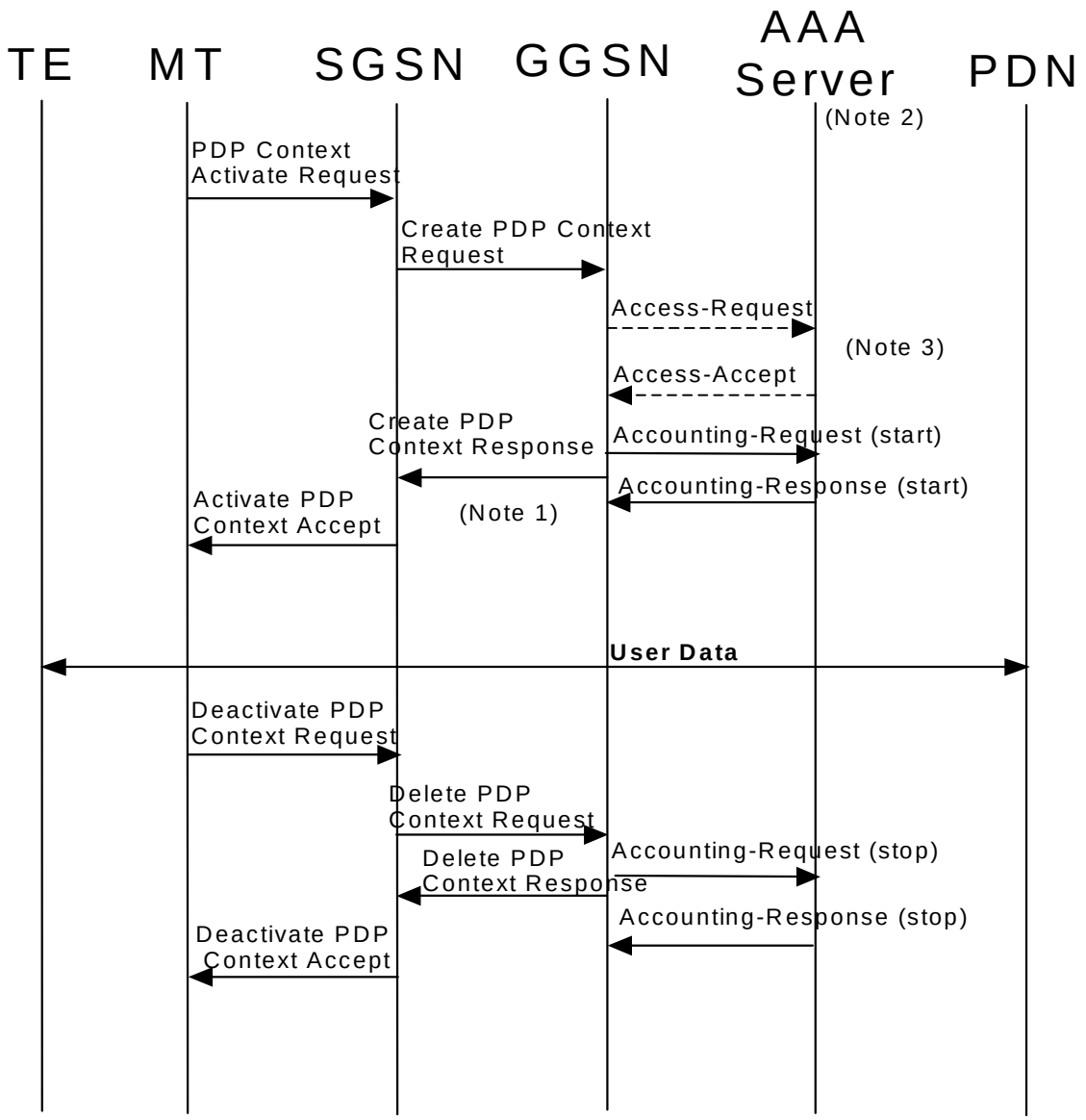
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest 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.

16.3 Authentication and accounting message flows

16.3.1 IP PDP type

The figure 14 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. Both Authentication and Accounting servers may be optional and separately configured for each APN.

NOTE 2: Separate accounting and authentication servers may be used.

NOTE 3: The Access-Request message shall be used for primary PDP context only.

Figure 14: 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 allocation the AAA server shall return the allocated IP address 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, 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. User data forwarding at the GGSN may not be allowed before the Accounting Response START is received. If this is the case, the GGSN drops user data until the Accounting Response START is received. This is configurable per 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 (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.

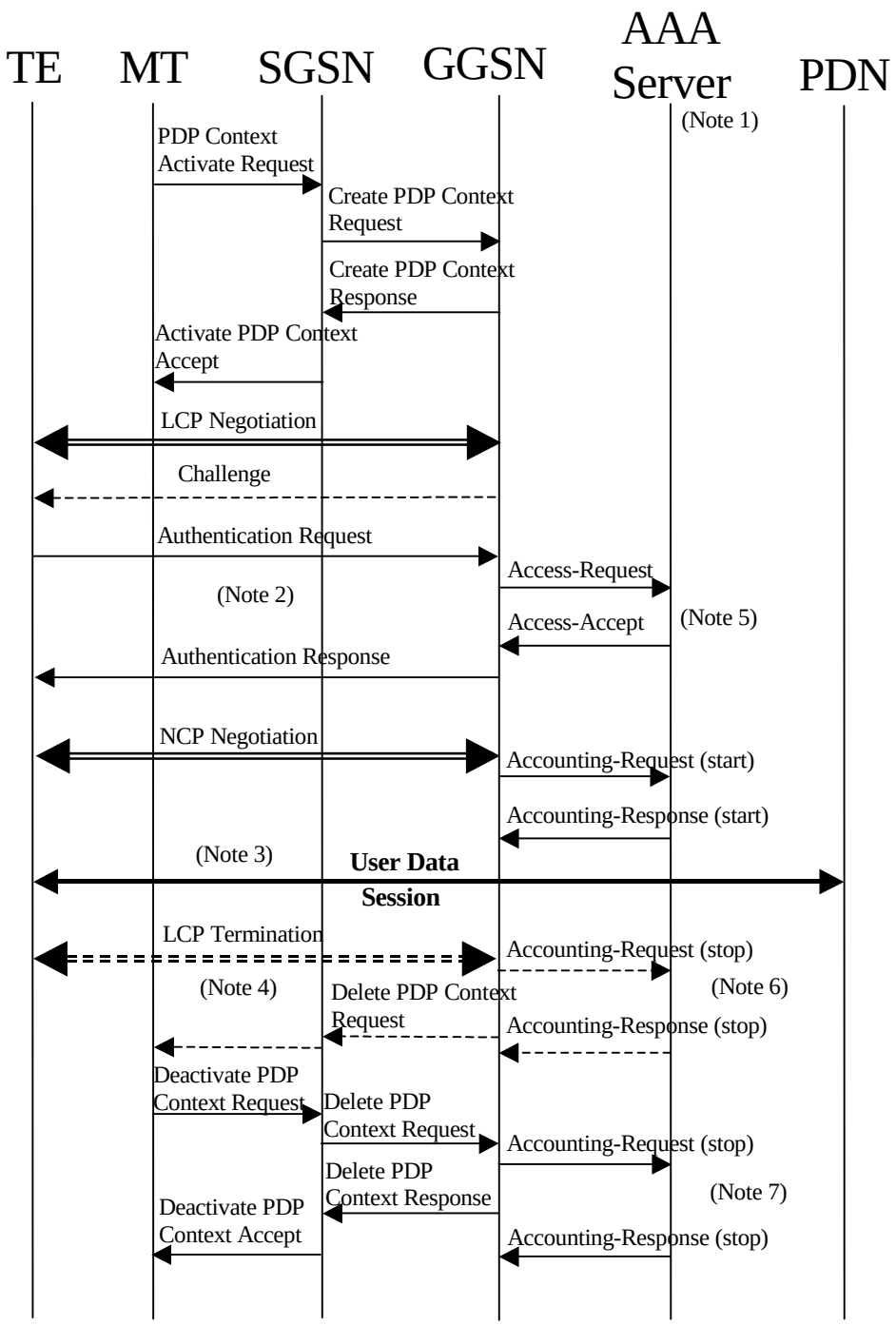
The GGSN may send an Accounting-Request ON message to the AAA server to indicate that a restart has occurred. The AAA server may then release the associated resources.

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 [38].

16.3.2 PPP PDP type

The figure 15 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 this specification.



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: User data may not be allowed before the Accounting Response (START) is received. If this is the case, the GGSN drops user data until the Accounting Response (START) is 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 15: 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 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, 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.

User data forwarding at the GGSN may not be allowed before the Accounting Response START is received. If this is the case, the GGSN drops user data until the Accounting Response START is received. This is configurable per 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 (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 [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 16).

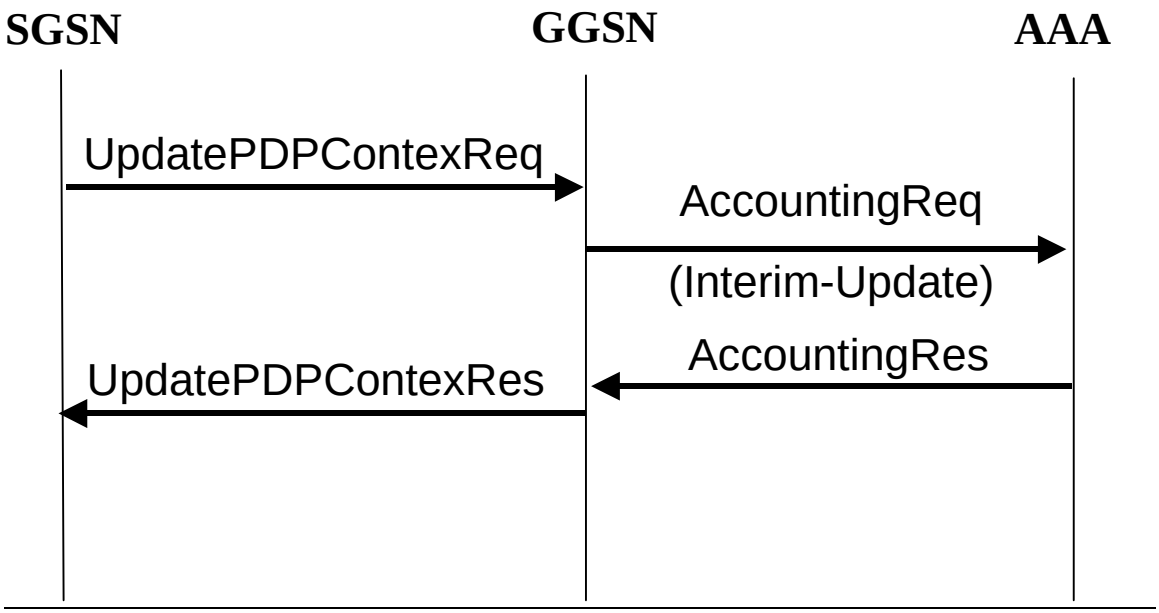


Figure 16: RADIUS for PDP context Update

16.4 List of RADIUS attributes

The following tables describe the actual content of the RADIUS messages exchanged between the GGSN and the AAA server. Other RADIUS attributes may be used as defined in RADIUS RFC(s). Unless otherwise stated, when the encoding scheme of an attribute is specified as UTF-8 encoding, this shall be interpreted as UTF-8 hexadecimal encoding.

16.4.1 Access-Request message (sent from the GGSN to AAA server)

The table 1 describes the attributes of the Access-Request message.

Table 1: The attributes of the Access-Request message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username is provided by the user (extracted from the Protocol Configuration Options (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.	String	Mandatory
2	User-Password	User password provided by the user if PAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used). If no password is available a generic password, configurable on a per APN basis, shall be present.	String	Conditional Note 1
3	CHAP-Password	User password provided by the user if CHAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used).	String	Conditional Note 2
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed-Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	IP address allocated for this user	IPv4	Conditional
9	Framed-IP-Netmask	Netmask for the user IP address	IPv4	Conditional
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded decimal. Note that there are no leading characters in front of the country code.	Mandatory
60	CHAP-Challenge	Challenge if CHAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used).	String	Conditional Note 2
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according sub-clause 16.4.8~~7~~	See sub-clause 16.4.8~~7~~	Optional except sub-attribute 3 which is conditional

NOTE 1: Shall be present if PAP is used.

NOTE 2: Shall be present if CHAP is used.

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

16.4.2 Access-Accept (sent from AAA server to GGSN)

The table 2 describes the attributes of the Access-Accept message.

Table 2: The attributes of the Access-Accept message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username received in the Access-Request message or a substitute username provided by the AAA server. If the User-Name has been received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed-Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	IP address allocated for this user, if the AAA server is used to allocate IP address.	IPv4	Conditional
9	Framed-IP-Netmask	Netmask for the user IP address, if the AAA server is used to allocate IP netmask.	IPv4	Conditional
12	Framed-IP-MTU	MTU for the user towards this particular APN, MTU shall be less or equal to 1500	String	Optional
25	Class	Identifier to be used in all subsequent accounting messages.	String	Optional (NOTE 4)
27	Session-Timeout	Indicates the timeout value (in seconds) for the user session	32 bit unsigned Integer	Optional
28	Idle-Timeout	Indicates the timeout value (in seconds) for idle user session	32 bit unsigned Integer	Optional
26/311	MS- primary-DNS-server	Contains the primary DNS server address for this APN	Ipv4	Optional
26/311	MS-Secondary-DNS-Server	Contains the secondary DNS server address for this APN	IPv4	Optional
26/311	MS-Primary-NBNS-Server	Contains the primary NetBios name server address for this APN	IPv4	Optional
26/311	MS-Secondary-NBNS-Server	Contains the secondary NetBios server address for this APN	IPv4	Optional
NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message				

16.4.3 Accounting-Request START (sent from GGSN to AAA server)

The table 3 describes the attributes of the Accounting-Request START message.

Table 3: The attributes of the Accounting-Request START 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 received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
4	NAS-IP-Address	GGSN IP address for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional

8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Conditional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded decimal. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Type of accounting message	START	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time (in seconds) of the event generating this Accounting-Request.	32 unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according sub-clause 16.4.8~~7~~.	See sub-clause 16.4.8~~7~~	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.4 Accounting Request STOP (sent from GGSN to AAA server)

The table 4 describes the attributes of the Accounting-Request STOP message.

Table 4: The attributes of the Accounting-Request STOP 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 received in the Access-Accept message, this user-name shall be used in preference to the	String	Optional

		above		
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Optional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Indicates the type of accounting request	STOP	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time of the event generating this Accounting-Request	Second	Optional
42	Acct-Input-Octets	GGSN counted number of octets sent by the user for the PDP context	32 bit unsigned integer	Optional
43	Acct-Output-Octets	GGSN counted number of octets received by the user for the PDP context	32 bit unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
46	Acct-Session-Time	Duration of the session	Second	Optional
47	Acct-Input-Packets	GGSN counted number of packets sent by the user	Packet	Optional
48	Acct-Output-Packets	GGSN counted number of packets received by the user	Packet	Optional
49	Acct-Terminate-Cause	Indicate how the session was terminated	See RFC 2866	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according to sub-clause 16.4.~~7~~8.	See sub-clause 16.4.~~7~~8	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.5 Accounting Request ON (optionally sent from GGSN to AAA server)

The table 5 describes the attributes of the Accounting-Request ON message.

Table 5: The attributes of the Accounting-Request ON message

Attr #	Attribute Name	Description	Content	Presence Requirement
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
30	Called-Station-ID	Identifier for the target network.	APN (UTF-8 encoded)	Optional
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.				

16.4.6 Accounting Request OFF (optionally sent from GGSN to AAA server)

The table 6 describes the attributes of the Accounting-Request OFF message.

Table 6: The attributes of the Accounting-Request OFF message

Attr #	Attribute Name	Description	Content	Presence Requirement
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
30	Called-Station-ID	Identifier for the target network.	APN (UTF-8 encoded)	Optional
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.				

16.4.7 Accounting Request Interim-Update (sent from GGSN to AAA server)

The table 7 describes the attributes of the Accounting-Request Interim-Update message.

Table 7: The attributes of the Accounting-Request Interim-Update 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 received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with	String	Conditional

		the AAA server.		Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Optional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Indicates the type of accounting request	Interim-Update	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time of the event generating this Accounting-Request	Second	Optional
42	Acct-Input-Octets	GGSN counted number of octets sent by the user for the PDP context	32 bit unsigned integer	Optional
43	Acct-Output-Octets	GGSN counted number of octets received by the user for the PDP context	32 bit unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
46	Acct-Session-Time	Duration of the session	Second	Optional
47	Acct-Input-Packets	GGSN counted number of packets sent by the user	Packet	Optional
48	Acct-Output-Packets	GGSN counted number of packets received by the user	Packet	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according to sub-clause 16.4.7.	See sub-clause 16.4.8	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.8~~7~~ Sub-attributes of the 3GPP Vendor-Specific attribute

The table ~~7~~ 8 describes the sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START and Accounting-Request STOP message.

Table ~~7~~8: The sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START and Accounting-Request STOP message

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-QoS-Profile	QoS profile received	Optional	Access-Request, Accounting-Request 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, Access-Request STOP, Accounting-Request Interim-Update
11	3GPP- Session-Stop-Indicator	Indicateds 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 available in R99 and later releases)	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update

3GPP TSG-CN WG3 Meeting #19
Brighton, U.K. 15th - 19th September 2001

Tdoc N3-010473

CR-Form-v4

CHANGE REQUEST

⌘ **09.61** **CR** **A028** ⌘ ev **-** ⌘ Current version: **7.4.0** ⌘

*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 **X**

Title:	⌘	Standard method for information update between GPRS and external PDN using RADIUS
Source:	⌘	CN3
Work item code:	⌘	GPRS
Date:	⌘	19.10.2001
Category:	⌘	**A**
Release:	⌘	R98

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)

Reason for change:	⌘	When using RADIUS on the Gi interface, several information related to the PDP context are sent from the GGSN to AAA server using the RADIUS protocol. During the life of a PDP context some of those information may be updated (e.g. SGSN address). To avoid inconsistencies between the AAA server and the GPRS network, any information changed in a PDP context should also be updated in the AAA.
Summary of change:	⌘	This CR proposes to use RADIUS Accounting to update the information related to a PDP context, when this PDP contex is being updated.
Consequences if not approved:	⌘	Inconsistencies between the SGSN, GGSN and AAA server

Clauses affected:	⌘	16		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘	CR A022 should be implemented on top of this CR.		

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.

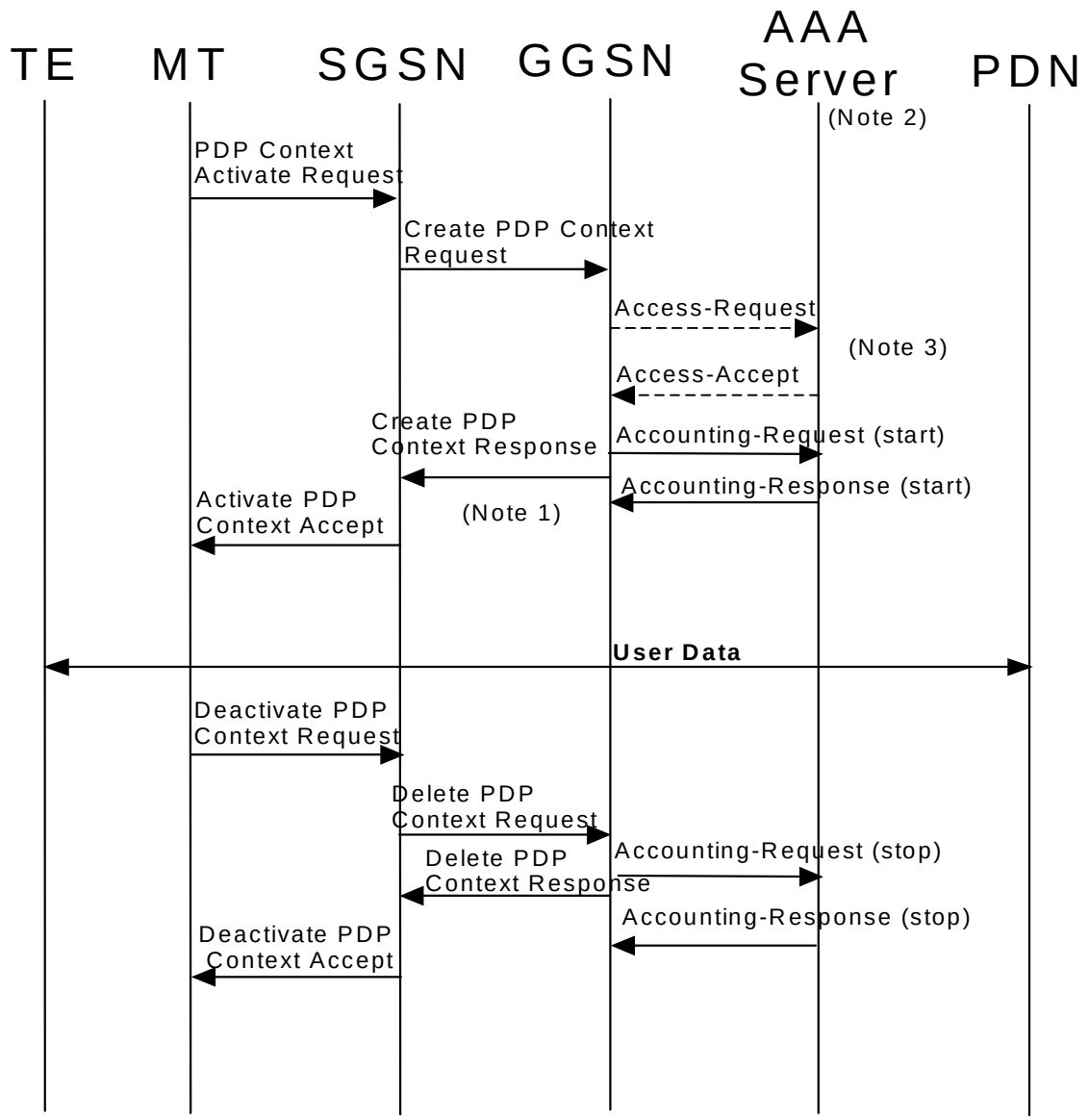
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest 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.

16.3 Authentication and accounting message flows

16.3.1 IP PDP type

The figure 14 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. Both Authentication and Accounting servers may be optional and separately configured for each APN.

NOTE 2: Separate accounting and authentication servers may be used.

NOTE 3: The Access-Request message shall be used for primary PDP context only.

Figure 14: 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 allocation the AAA server shall return the allocated IP address 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, 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. User data forwarding at the GGSN may not be allowed before the Accounting Response START is received. If this is the case, the GGSN drops user data until the Accounting Response START is received. This is configurable per 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 (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.

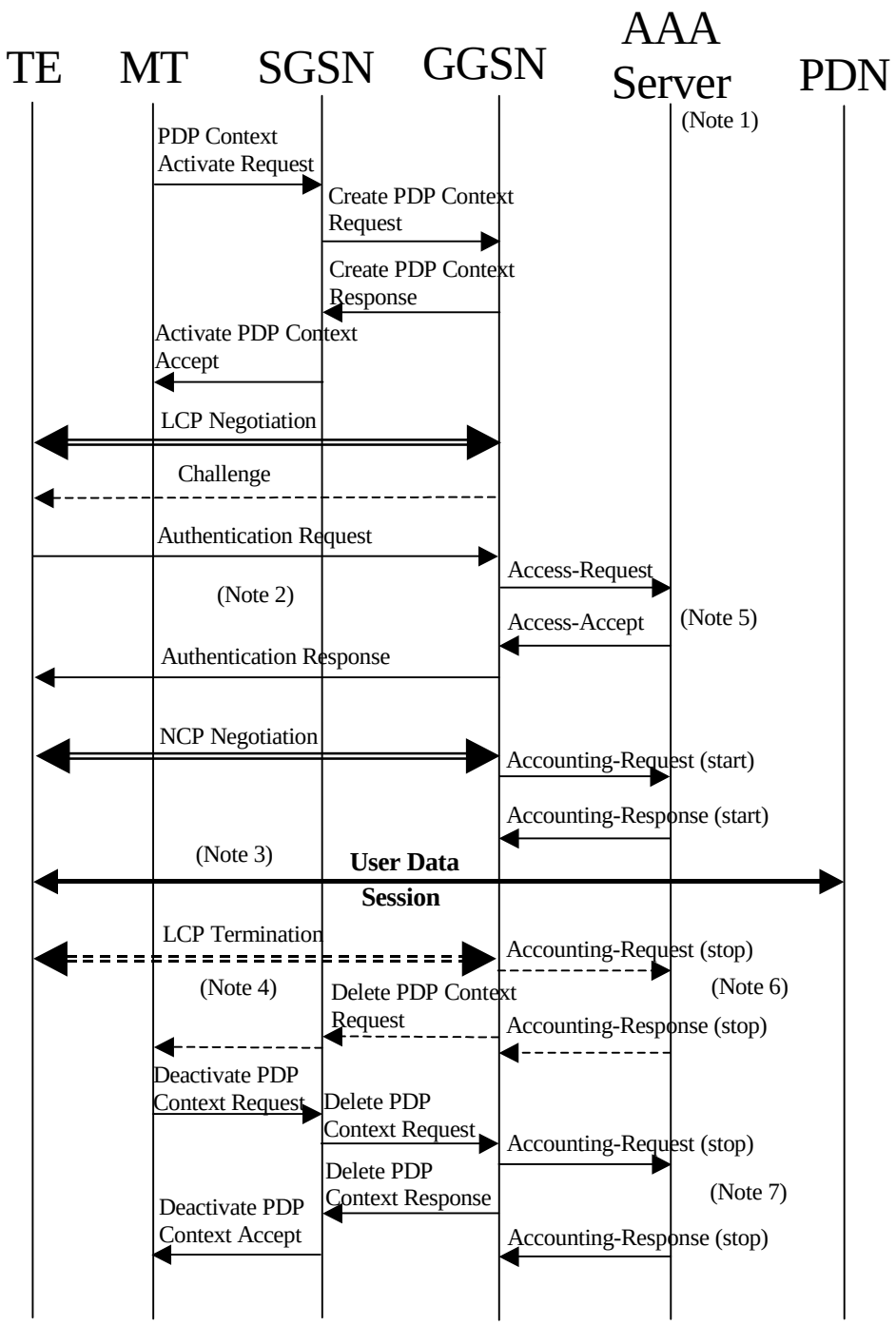
The GGSN may send an Accounting-Request ON message to the AAA server to indicate that a restart has occurred. The AAA server may then release the associated resources.

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 [38].

16.3.2 PPP PDP type

The figure 15 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 this specification.



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: User data may not be allowed before the Accounting Response (START) is received. If this is the case, the GGSN drops user data until the Accounting Response (START) is 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 15: 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 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, 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.

User data forwarding at the GGSN may not be allowed before the Accounting Response START is received. If this is the case, the GGSN drops user data until the Accounting Response START is received. This is configurable per 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 (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 [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 16).

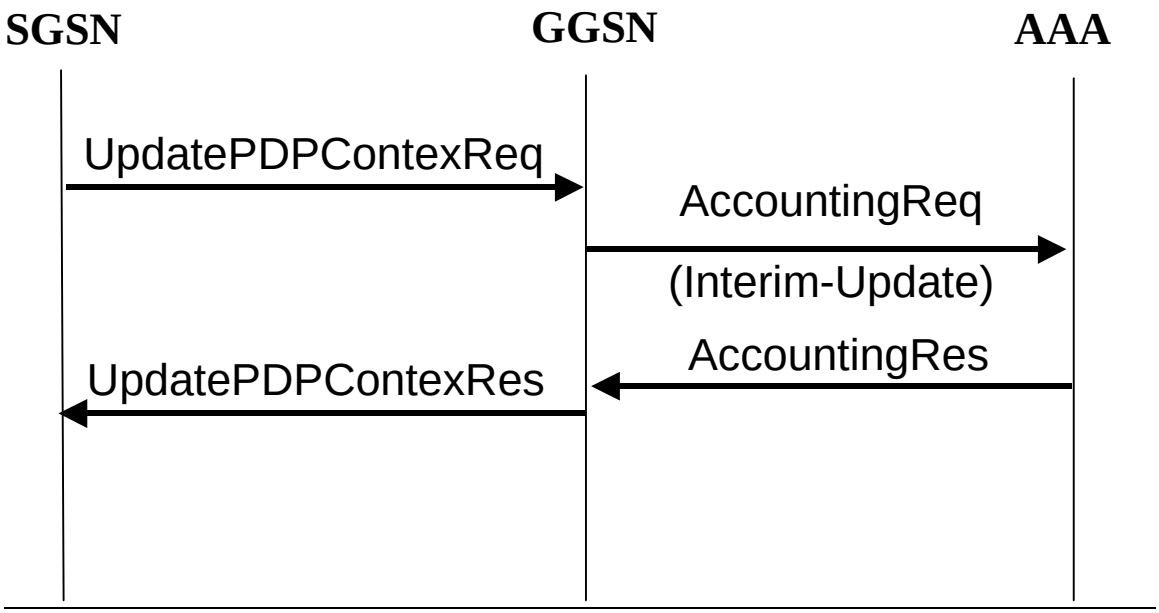


Figure 16: RADIUS for PDP context Update

16.4 List of RADIUS attributes

The following tables describe the actual content of the RADIUS messages exchanged between the GGSN and the AAA server. Other RADIUS attributes may be used as defined in RADIUS RFC(s). Unless otherwise stated, when the encoding scheme of an attribute is specified as UTF-8 encoding, this shall be interpreted as UTF-8 hexadecimal encoding.

16.4.1 Access-Request message (sent from the GGSN to AAA server)

The table 1 describes the attributes of the Access-Request message.

Table 1: The attributes of the Access-Request message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username is provided by the user (extracted from the Protocol Configuration Options (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.	String	Mandatory
2	User-Password	User password provided by the user if PAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used). If no password is available a generic password, configurable on a per APN basis, shall be present.	String	Conditional Note 1
3	CHAP-Password	User password provided by the user if CHAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used).	String	Conditional Note 2
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed-Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	IP address allocated for this user	IPv4	Conditional
9	Framed-IP-Netmask	Netmask for the user IP address	IPv4	Conditional
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded decimal. Note that there are no leading characters in front of the country code.	Mandatory
60	CHAP-Challenge	Challenge if CHAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used).	String	Conditional Note 2
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according sub-clause 16.4.8~~7~~	See sub-clause 16.4.8~~7~~	Optional except sub-attribute 3 which is conditional

NOTE 1: Shall be present if PAP is used.

NOTE 2: Shall be present if CHAP is used.

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

16.4.2 Access-Accept (sent from AAA server to GGSN)

The table 2 describes the attributes of the Access-Accept message.

Table 2: The attributes of the Access-Accept message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username received in the Access-Request message or a substitute username provided by the AAA server. If the User-Name has been received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed-Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	IP address allocated for this user, if the AAA server is used to allocate IP address.	IPv4	Conditional
9	Framed-IP-Netmask	Netmask for the user IP address, if the AAA server is used to allocate IP netmask.	IPv4	Conditional
12	Framed-IP-MTU	MTU for the user towards this particular APN, MTU shall be less or equal to 1500	String	Optional
25	Class	Identifier to be used in all subsequent accounting messages.	String	Optional (NOTE 4)
27	Session-Timeout	Indicates the timeout value (in seconds) for the user session	32 bit unsigned Integer	Optional
28	Idle-Timeout	Indicates the timeout value (in seconds) for idle user session	32 bit unsigned Integer	Optional
26/311	MS- primary-DNS-server	Contains the primary DNS server address for this APN	Ipv4	Optional
26/311	MS-Secondary-DNS-Server	Contains the secondary DNS server address for this APN	IPv4	Optional
26/311	MS-Primary-NBNS-Server	Contains the primary NetBios name server address for this APN	IPv4	Optional
26/311	MS-Secondary-NBNS-Server	Contains the secondary NetBios server address for this APN	IPv4	Optional
NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message				

16.4.3 Accounting-Request START (sent from GGSN to AAA server)

The table 3 describes the attributes of the Accounting-Request START message.

Table 3: The attributes of the Accounting-Request START 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 received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
4	NAS-IP-Address	GGSN IP address for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional

8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Conditional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded decimal. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Type of accounting message	START	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time (in seconds) of the event generating this Accounting-Request.	32 unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according sub-clause 16.4.8~~7~~.	See sub-clause 16.4.8~~7~~	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.4 Accounting Request STOP (sent from GGSN to AAA server)

The table 4 describes the attributes of the Accounting-Request STOP message.

Table 4: The attributes of the Accounting-Request STOP 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 received in the Access-Accept message, this user-name shall be used in preference to the	String	Optional

		above		
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Optional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Indicates the type of accounting request	STOP	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time of the event generating this Accounting-Request	Second	Optional
42	Acct-Input-Octets	GGSN counted number of octets sent by the user for the PDP context	32 bit unsigned integer	Optional
43	Acct-Output-Octets	GGSN counted number of octets received by the user for the PDP context	32 bit unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
46	Acct-Session-Time	Duration of the session	Second	Optional
47	Acct-Input-Packets	GGSN counted number of packets sent by the user	Packet	Optional
48	Acct-Output-Packets	GGSN counted number of packets received by the user	Packet	Optional
49	Acct-Terminate-Cause	Indicate how the session was terminated	See RFC 2866	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according to sub-clause 16.4.~~7~~8.	See sub-clause 16.4.~~7~~8	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.5 Accounting Request ON (optionally sent from GGSN to AAA server)

The table 5 describes the attributes of the Accounting-Request ON message.

Table 5: The attributes of the Accounting-Request ON message

Attr #	Attribute Name	Description	Content	Presence Requirement
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
30	Called-Station-ID	Identifier for the target network.	APN (UTF-8 encoded)	Optional
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.				

16.4.6 Accounting Request OFF (optionally sent from GGSN to AAA server)

The table 6 describes the attributes of the Accounting-Request OFF message.

Table 6: The attributes of the Accounting-Request OFF message

Attr #	Attribute Name	Description	Content	Presence Requirement
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
30	Called-Station-ID	Identifier for the target network.	APN (UTF-8 encoded)	Optional
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.				

16.4.7 Accounting Request Interim-Update (sent from GGSN to AAA server)

The table 7 describes the attributes of the Accounting-Request Interim-Update message.

Table 7: The attributes of the Accounting-Request Interim-Update 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 received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with	String	Conditional

		the AAA server.		Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Optional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Indicates the type of accounting request	Interim-Update	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time of the event generating this Accounting-Request	Second	Optional
42	Acct-Input-Octets	GGSN counted number of octets sent by the user for the PDP context	32 bit unsigned integer	Optional
43	Acct-Output-Octets	GGSN counted number of octets received by the user for the PDP context	32 bit unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
46	Acct-Session-Time	Duration of the session	Second	Optional
47	Acct-Input-Packets	GGSN counted number of packets sent by the user	Packet	Optional
48	Acct-Output-Packets	GGSN counted number of packets received by the user	Packet	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according to sub-clause 16.4.7.	See sub-clause 16.4.8	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.8~~7~~ Sub-attributes of the 3GPP Vendor-Specific attribute

The table ~~7~~ 8 describes the sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START and Accounting-Request STOP message.

Table ~~7~~8: The sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START and Accounting-Request STOP message

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-QoS-Profile	QoS profile received	Optional	Access-Request, Accounting-Request 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, Access-Request STOP, Accounting-Request Interim-Update
11	3GPP- Session-Stop-Indicator	Indicateds 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

3GPP TSG-CN WG3 Meeting #19
Brighton, U.K. 15th - 19th September 2001

Tdoc N3-010474

CR-Form-v4

CHANGE REQUEST

⌘ **09.61** **CR** **A027** ⌘ ev **-** ⌘ Current version: **6.5.0** ⌘

*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:	⌘	Standard method for information update between GPRS and external PDN using RADIUS
Source:	⌘	CCN3
Work item code:	⌘	GPRS
Date:	⌘	19.10.2001
Category:	⌘	**F**
Release:	⌘	R97

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)

Reason for change:	⌘	When using RADIUS on the Gi interface, several information related to the PDP context are sent from the GGSN to AAA server using the RADIUS protocol. During the life of a PDP context some of those information may be updated (e.g. SGSN address). To avoid inconsistencies between the AAA server and the GPRS network, any information changed in a PDP context should also be updated in the AAA.
Summary of change:	⌘	This CR proposes to use RADIUS Accounting to update the information related to a PDP context, when this PDP contex is being updated.
Consequences if not approved:	⌘	Inconsistencies between the SGSN, GGSN and AAA server

Clauses affected:	⌘	16
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	CR A021 should be implemented on top of this CR.

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.

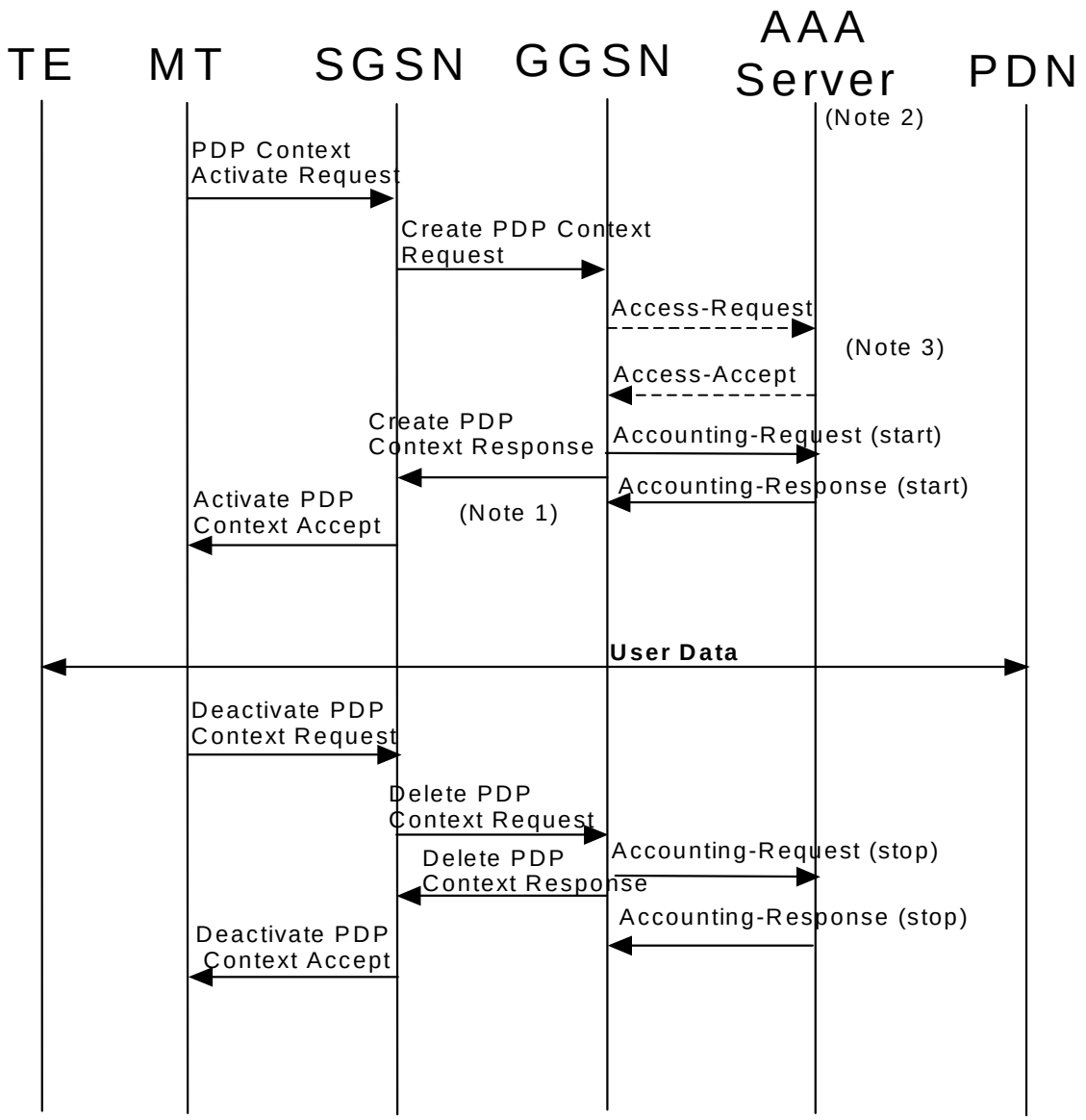
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest 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.

16.3 Authentication and accounting message flows

16.3.1 IP PDP type

The figure 14 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. Both Authentication and Accounting servers may be optional and separately configured for each APN.

NOTE 2: Separate accounting and authentication servers may be used.

NOTE 3: The Access-Request message shall be used for primary PDP context only.

Figure 14: 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 allocation the AAA server shall return the allocated IP address 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, 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. User data forwarding at the GGSN may not be allowed before the Accounting Response START is received. If this is the case, the GGSN drops user data until the Accounting Response START is received. This is configurable per 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 (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 [21].

16.3.2 Void

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 16).

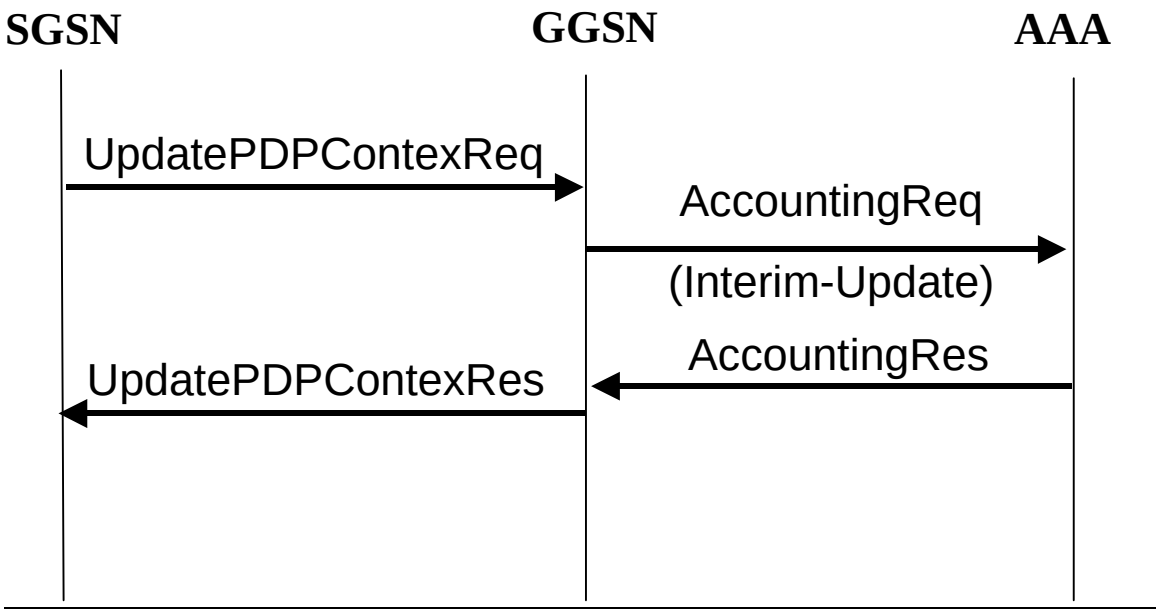


Figure 16: RADIUS for PDP context Update

16.4 List of RADIUS attributes

The following tables describe the actual content of the RADIUS messages exchanged between the GGSN and the AAA server. Other RADIUS attributes may be used as defined in RADIUS RFC(s). Unless otherwise stated, when the encoding scheme of an attribute is specified as UTF-8 encoding, this shall be interpreted as UTF-8 hexadecimal encoding.

16.4.1 Access-Request message (sent from the GGSN to AAA server)

The table 1 describes the attributes of the Access-Request message.

Table 1: The attributes of the Access-Request message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username is provided by the user (extracted from the Protocol Configuration Options (PCO) field of the Create PDP Context Request message). If no username is available a generic username, configurable on a per APN basis, shall be present.	String	Mandatory
2	User-Password	User password provided by the user if PAP is used (extracted from the PCO field of the Create PDP Context Request message). If no password is available a generic password, configurable on a per APN basis, shall be present.	String	Conditional Note 1
3	CHAP-Password	User password provided by the user if CHAP is used (extracted from the PCO field of the Create PDP Context Request message).	String	Conditional Note 2
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed-Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	IP address allocated for this user	IPv4	Conditional
9	Framed-IP-Netmask	Netmask for the user IP address	IPv4	Conditional
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded decimal. Note that there are no leading characters in front of the country code.	Mandatory
60	CHAP-Challenge	Challenge if CHAP is used (extracted from the PCO field of the Create PDP Context Request message).	String	Conditional Note 2
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according sub-clause 16.4.7	See sub-clause 16.4.7	Optional except sub-attribute 3 which is conditional

NOTE 1: Shall be present if PAP is used.

NOTE 2: Shall be present if CHAP is used.

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

16.4.2 Access-Accept (sent from AAA server to GGSN)

The table 2 describes the attributes of the Access-Accept message.

Table 2: The attributes of the Access-Accept message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username received in the Access-Request message or a substitute username provided by the AAA server. If the User-Name has been received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed-Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	IP address allocated for this user, if the AAA server is used to allocate IP address.	IPv4	Conditional
9	Framed-IP-Netmask	Netmask for the user IP address, if the AAA server is used to allocate IP netmask.	IPv4	Conditional
12	Framed-IP-MTU	MTU for the user towards this particular APN, MTU shall be less or equal to 1500	String	Optional
25	Class	Identifier to be used in all subsequent accounting messages.	String	Optional (NOTE 4)
27	Session-Timeout	Indicates the timeout value (in seconds) for the user session	32 bit unsigned Integer	Optional
28	Idle-Timeout	Indicates the timeout value (in seconds) for idle user session	32 bit unsigned Integer	Optional
26/311	MS- primary-DNS-server	Contains the primary DNS server address for this APN	Ipv4	Optional
26/311	MS-Secondary-DNS-Server	Contains the secondary DNS server address for this APN	IPv4	Optional
26/311	MS-Primary-NBNS-Server	Contains the primary NetBios name server address for this APN	IPv4	Optional
26/311	MS-Secondary-NBNS-Server	Contains the secondary NetBios server address for this APN	IPv4	Optional
NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message				

16.4.3 Accounting-Request START (sent from GGSN to AAA server)

The table 3 describes the attributes of the Accounting-Request START message.

Table 3: The attributes of the Accounting-Request START 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). If no username is available a generic username, configurable on a per APN basis, shall be present. If the User-Name has been received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
4	NAS-IP-Address	GGSN IP address for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Conditional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded decimal. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Type of accounting message	START	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time (in seconds) of the event generating this Accounting-Request.	32 unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according sub-clause 16.4.7.	See sub-clause 16.4.7	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.4 Accounting Request STOP (sent from GGSN to AAA server)

The table 4 describes the attributes of the Accounting-Request STOP message.

Table 4: The attributes of the Accounting-Request STOP 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). If no username is available a generic username, configurable on a per APN basis, shall be present. If the User-Name has been received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Optional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Indicates the type of accounting request	STOP	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time of the event generating this Accounting-Request	Second	Optional
42	Acct-Input-Octets	GGSN counted number of octets sent by the user for the PDP context	32 bit unsigned integer	Optional
43	Acct-Output-Octets	GGSN counted number of octets received by the user for the PDP context	32 bit unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
46	Acct-Session-Time	Duration of the session	Second	Optional
47	Acct-Input-Packets	GGSN counted number of packets sent by the user	Packet	Optional

48	Acct-Output-Packets	GGSN counted number of packets received by the user	Packet	Optional
49	Acct-Terminate-Cause	Indicate how the session was terminated	See RFC 2866	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according to sub-clause 16.4.7.	See sub-clause 16.4.7	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.5 Accounting Request ON (optionally sent from GGSN to AAA server)

The table 5 describes the attributes of the Accounting-Request ON message.

Table 5: The attributes of the Accounting-Request ON message

Attr #	Attribute Name	Description	Content	Presence Requirement
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
30	Called-Station-ID	Identifier for the target network.	APN (UTF-8 encoded)	Optional
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

16.4.6 Accounting Request OFF (optionally sent from GGSN to AAA server)

The table 6 describes the attributes of the Accounting-Request OFF message.

Table 6: The attributes of the Accounting-Request OFF message

Attr #	Attribute Name	Description	Content	Presence Requirement
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
30	Called-Station-ID	Identifier for the target network.	APN (UTF-8 encoded)	Optional
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

16.4.7 Accounting Request Interim-Update (sent from GGSN to AAA server)

The table 7 describes the attributes of the Accounting-Request Interim-Update message.

Table 7: The attributes of the Accounting-Request Interim-Update message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username provided by the user (extracted from	String	Optional

		the PCO field of the Create PDP Context Request message). If no username is available a generic username, configurable on a per APN basis, shall be present. If the User-Name has been received in the Access-Accept message, this user-name shall be used in preference to the above		
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Optional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Indicates the type of accounting request	Interim-Update	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time of the event generating this Accounting-Request	Second	Optional
42	Acct-Input-Octets	GGSN counted number of octets sent by the user for the PDP context	32 bit unsigned integer	Optional
43	Acct-Output-Octets	GGSN counted number of octets received by the user for the PDP context	32 bit unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
46	Acct-Session-Time	Duration of the session	Second	Optional
47	Acct-Input-Packets	GGSN counted number of packets sent by the user	Packet	Optional
48	Acct-Output-Packets	GGSN counted number of packets received by the user	Packet	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according to sub-clause 16.4.7.	See sub-clause 16.4.8	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.8~~7~~ Sub-attributes of the 3GPP Vendor-Specific attribute

The table ~~7~~ 8 describes the sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START and Accounting-Request STOP message.

Table ~~7~~8: The sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START and Accounting-Request STOP message

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	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-QoS-Profile	QoS profile received	Optional	Access-Request, Accounting-Request 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, Access-Request STOP, Accounting-Request Interim-Update
11	3GPP- Session-Stop-Indicator	Indicateds 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

3GPP TSG-CN WG3 Meeting #19
Brighton, U.K. 15th - 19th September 2001

Tdoc N3-010475

CR-Form-v4

CHANGE REQUEST

⌘ **29.061** **CR** **024** ⌘ ev **2** ⌘ Current version: **4.2.0** ⌘

*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 **X**

Title:	⌘	Standard method for interworking between GPRS and external PDN using RADIUS
Source:	⌘	CN3
Work item code:	⌘	GPRS ***Date:*** ⌘ 19.10.2001
Category:	⌘	**A** ***Release:*** ⌘ REL-4

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)*
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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)

Reason for change:	⌘	RADIUS is used between the GGSN and PDN hosting IP applications. The GGSN interworks with AAA server or proxy AAA using the RADIUS protocol to authenticate and authorize users, but also to deliver information related to user sessions. However some applications may want to interwork with the GGSN to trigger the deletion of a PDP context, this option is not specified in the 3GPP specifications today.
Summary of change:	⌘	This CR proposes to use RADIUS Disconnect Request to trigger the termination of a given PDP context in the GGSN.
Consequences if not approved:	⌘	Mutually incompatible proprietary solutions will be developed.

Clauses affected:	⌘	2, 16
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	CR 028 should be implemented on top of this CR.

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.

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.

[1] 3GPP TS 01.04: "Digital cellular telecommunication system (Phase 2+); Abbreviations and acronyms".

[2] 3GPP TS 22.060: "3rd Generation Partnership Project: Technical Specification Group Services and System Aspects; General Packet Radio Service (GPRS): Stage 1 Service Description".

[3] 3GPP TS 23.060: "3rd Generation Partnership Project: Technical Specification Services and System Aspects; General Packet Radio Service (GPRS); Service Description Stage 2".

[4] 3GPP TS 03.61: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Multicast Service Description; Stage 2".

[5] 3GPP TS 03.62: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Group Call Service Description; Stage 2".

[6] 3GPP TS 03.64: "Digital cellular telecommunications system (Phase 2+);General Packet Radio Service (GPRS); Overall description of the Radio interface; Stage 2".

[7] 3GPP TS 04.60: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control / Medium Access Control (RLC/MAC) protocol".

[8] 3GPP TS 04.64: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Logical Link Control (LLC)".

[9] 3GPP TS 24.065: "3rd Generation Partnership Project: Technical Specification Group Core Network; General Packet Radio Service (GPRS); Mobile Station (MS) - Serving GPRS Support Node(SGSN); Subnetwork Dependent Convergence Protocol (SNDCP)".

[10] 3GPP TS 27.060: "3rd Generation Partnership Project: Technical Specification Group Core Network; Packet Domain; Mobile Station (MS) supporting Packet Switched Services".

[11] ITU-T Recommendation E.164: "Numbering plan for the ISDN era".

[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>

[21] IETF RFC 1661 and 1662 (1994): "The Point-to-Point Protocol (PPP)" (STD 51).

[22] IETF RFC 1700 (1994): "Assigned Numbers" (STD 2).3.

[23] UMTS 24.008: "Mobile radio interface layer 3 specification; Core Network Protocols – Stage 3".

[24] UMTS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".

[25] IETF RFC2794 (2000), Pat R. Calhoun and Charles E. Perkins: "Mobile IP Network Address Identifier Extension for IPv4", March 2000.

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

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

[28] IETF RFC2373 (1998): "IP version 6 Addressing Architecture".

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

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

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

[32] IETF RFC1112 (1989), S.E. Deering: "Host extensions for IP multicasting".

[33] IETF RFC2236 (1997), W. Fenner: "Internet Group Management Protocol, Version 2".

[34] IETF RFC2362 (1998), D. Estrin and al: "Protocol Independent Multicast-Sparse Mode (PIM-SM)".

[35] IETF RFC1075 (1988), D. Waitzman and al: "Distance Vector Multicast Routing Protocol".

[36] IETF RFC1585 (1994), J. Moy: "MOSPF"..

[37] IETF RFC2290 (1998), J. Solomon, S. Glass: "Mobile-IPv4 Configuration Option for PPP IPCP ".

[38] IETF RFC2865 (2000), C. Rigney, S. Willens, A. Rubens, W. Simpson: "Remote Authentication Dial In User Service (RADIUS)".

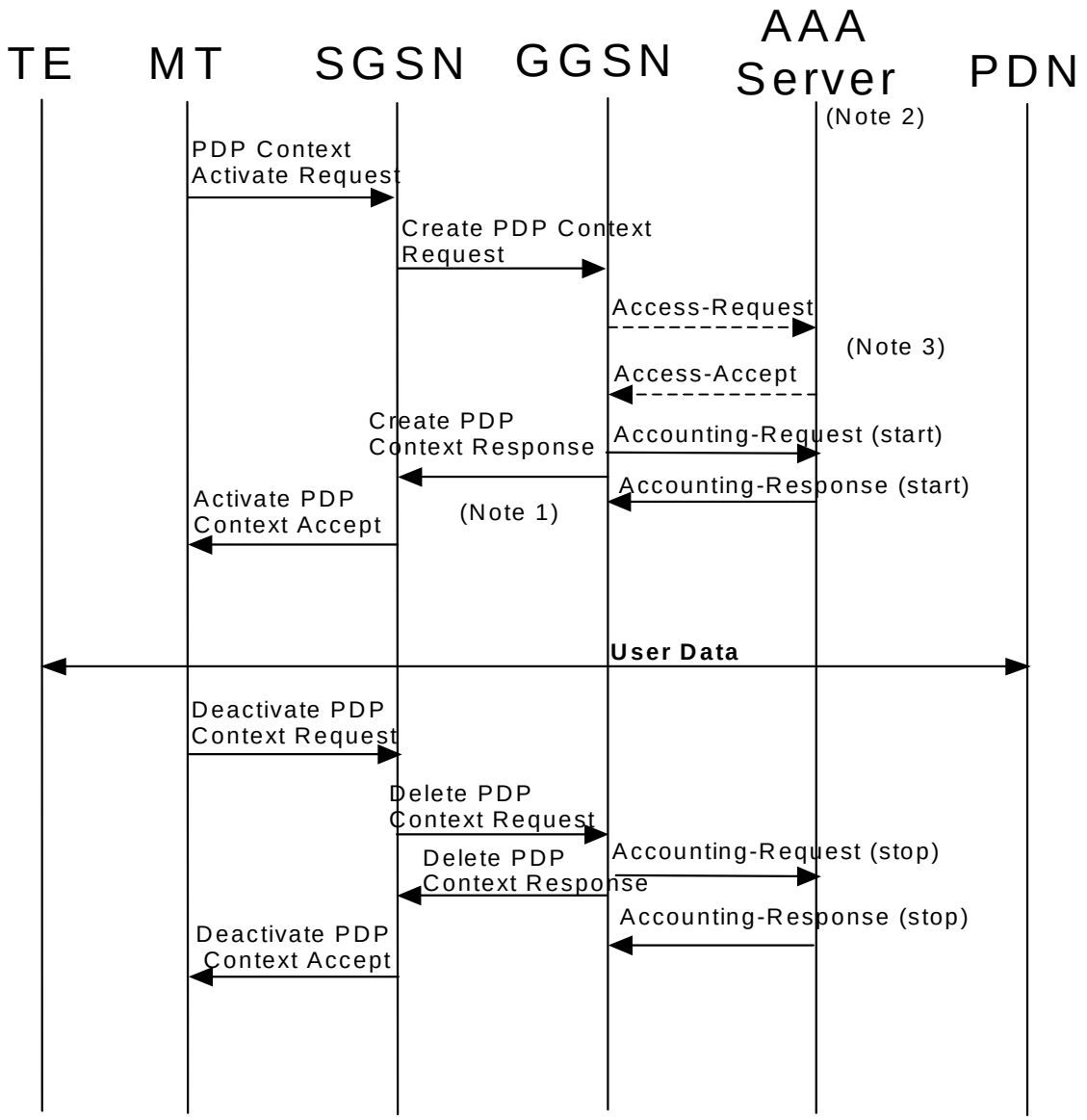
[39] IETF RFC2866 (2000), C. Rigney, Livingston: " RADIUS Accounting ".

[40] IETF RFC2882 (2000), D. Mitton: "Extended RADIUS Practices".

16.3 Authentication and accounting message flows

16.3.1 IP PDP type

The figure 14 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. Both Authentication and Accounting servers may be optional and separately configured for each APN.

NOTE 2: Separate accounting and authentication servers may be used.

NOTE 3: The Access-Request message shall be used for primary PDP context only.

Figure 14: 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 allocation the AAA server shall return the allocated IP address 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, 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. User data forwarding at the GGSN

may not be allowed before the Accounting Response START is received. If this is the case, the GGSN drops user data until the Accounting Response START is received. This is configurable per 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 (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.

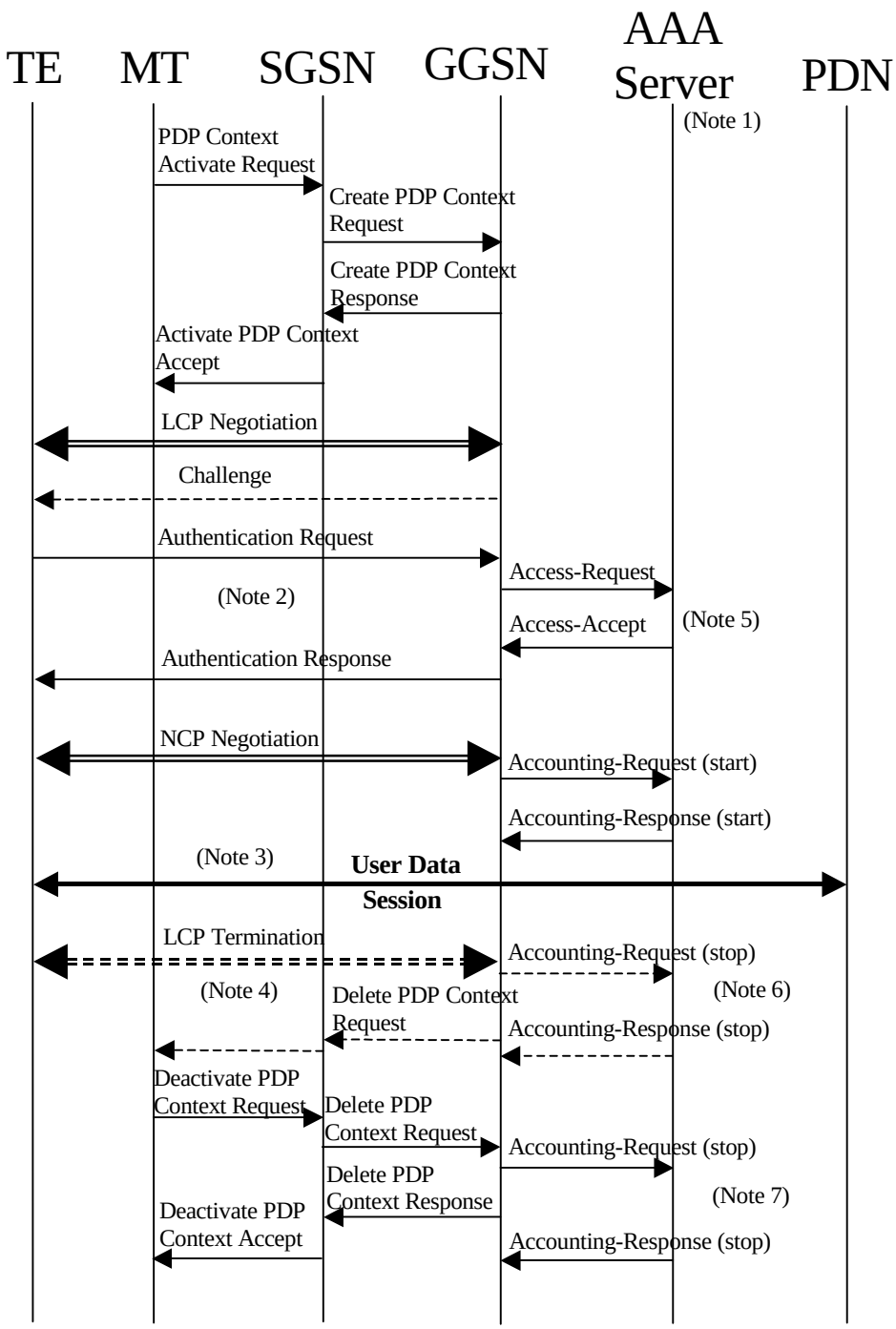
The GGSN may send an Accounting-Request ON message to the AAA server to indicate that a restart has occurred. The AAA server may then release the associated resources.

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 [38].

16.3.2 PPP PDP type

The figure 15 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 this specification.



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: User data may not be allowed before the Accounting Response (START) is received. If this is the case, the GGSN drops user data until the Accounting Response (START) is 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 15: 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 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, 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.

User data forwarding at the GGSN may not be allowed before the Accounting Response START is received. If this is the case, the GGSN drops user data until the Accounting Response START is received. This is configurable per 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 (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 [38].

16.3.3 AAA-Initiated PDP context termination

RADIUS is used as the protocol between the GGSN and a 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 16, the GGSN may react by deleting the corresponding PDP context or silently discard the Diconnect Request message. For more information on RADIUS Disconnect, see [40].

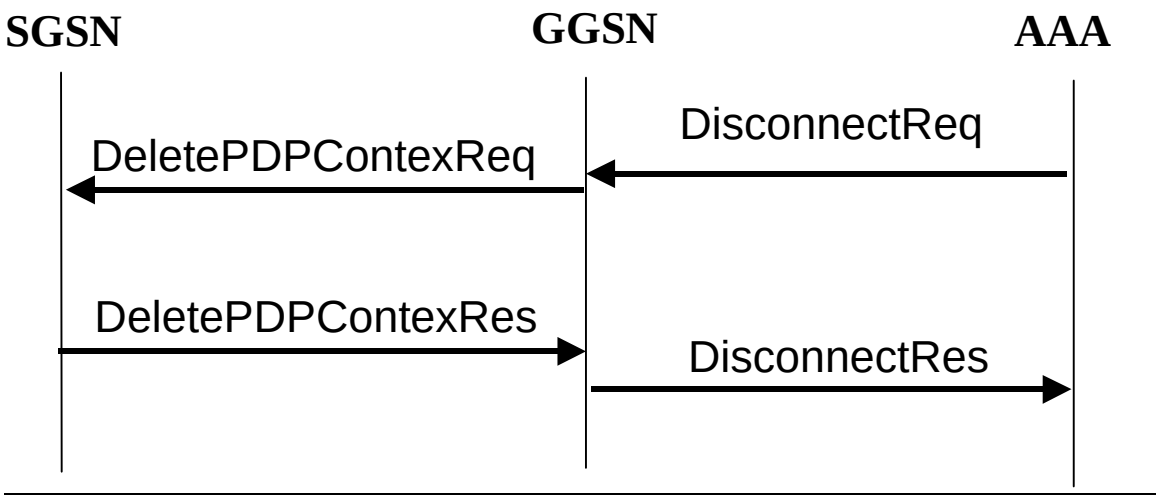


Figure16: PDP Context deletion with RADIUS

16.4 List of RADIUS attributes

The following tables describe the actual content of the RADIUS messages exchanged between the GGSN and the AAA server. Other RADIUS attributes may be used as defined in RADIUS RFC(s). Unless otherwise stated, when the encoding scheme of an attribute is specified as UTF-8 encoding, this shall be interpreted as UTF-8 hexadecimal encoding.

16.4.1 Access-Request message (sent from the GGSN to AAA server)

The table 1 describes the attributes of the Access-Request message.

Table 1: The attributes of the Access-Request message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username is provided by the user (extracted from the Protocol Configuration Options (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.	String	Mandatory
2	User-Password	User password provided by the user if PAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used). If no password is available a generic password, configurable on a per APN basis, shall be present.	String	Conditional Note 1
3	CHAP-Password	User password provided by the user if CHAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used).	String	Conditional Note 2
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed-Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	IP address allocated for this user	IPv4	Conditional
9	Framed-IP-Netmask	Netmask for the user IP address	IPv4	Conditional
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded decimal. Note that there are no leading characters in front of the country code.	Mandatory
60	CHAP-Challenge	Challenge if CHAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used).	String	Conditional Note 2
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according sub-clause 16.4.~~7~~8	See sub-clause 16.4.8~~7~~	Optional except sub-attribute 3 which is conditional

NOTE 1: Shall be present if PAP is used.

NOTE 2: Shall be present if CHAP is used.

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

16.4.2 Access-Accept (sent from AAA server to GGSN)

The table 2 describes the attributes of the Access-Accept message.

Table 2: The attributes of the Access-Accept message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username received in the Access-Request message or a substitute username provided by the AAA server. If the User-Name has been received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed-Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	IP address allocated for this user, if the AAA server is used to allocate IP address.	IPv4	Conditional
9	Framed-IP-Netmask	Netmask for the user IP address, if the AAA server is used to allocate IP netmask.	IPv4	Conditional
12	Framed-IP-MTU	MTU for the user towards this particular APN, MTU shall be less or equal to 1500	String	Optional
25	Class	Identifier to be used in all subsequent accounting messages.	String	Optional (NOTE 4)
27	Session-Timeout	Indicates the timeout value (in seconds) for the user session	32 bit unsigned Integer	Optional
28	Idle-Timeout	Indicates the timeout value (in seconds) for idle user session	32 bit unsigned Integer	Optional
26/311	MS- primary-DNS-server	Contains the primary DNS server address for this APN	Ipv4	Optional
26/311	MS-Secondary-DNS-Server	Contains the secondary DNS server address for this APN	IPv4	Optional
26/311	MS-Primary-NBNS-Server	Contains the primary NetBios name server address for this APN	IPv4	Optional
26/311	MS-Secondary-NBNS-Server	Contains the secondary NetBios server address for this APN	IPv4	Optional
NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message				

16.4.3 Accounting-Request START (sent from GGSN to AAA server)

The table 3 describes the attributes of the Accounting-Request START message.

Table 3: The attributes of the Accounting-Request START 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 received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
4	NAS-IP-Address	GGSN IP address for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional

8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Conditional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded decimal. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Type of accounting message	START	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time (in seconds) of the event generating this Accounting-Request.	32 unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according sub-clause 16.4.8~~7~~.	See sub-clause 16.4.8~~7~~	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.4 Accounting Request STOP (sent from GGSN to AAA server)

The table 4 describes the attributes of the Accounting-Request STOP message.

Table 4: The attributes of the Accounting-Request STOP 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 received in the Access-Accept message, this user-name shall be used in preference to the	String	Optional

		above		
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Optional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Indicates the type of accounting request	STOP	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time of the event generating this Accounting-Request	Second	Optional
42	Acct-Input-Octets	GGSN counted number of octets sent by the user for the PDP context	32 bit unsigned integer	Optional
43	Acct-Output-Octets	GGSN counted number of octets received by the user for the PDP context	32 bit unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
46	Acct-Session-Time	Duration of the session	Second	Optional
47	Acct-Input-Packets	GGSN counted number of packets sent by the user	Packet	Optional
48	Acct-Output-Packets	GGSN counted number of packets received by the user	Packet	Optional
49	Acct-Terminate-Cause	Indicate how the session was terminated	See RFC 2866	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according to sub-clause 16.4.~~7~~8.	See sub-clause 16.4.~~7~~8	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.5 Accounting Request ON (optionally sent from GGSN to AAA server)

The table 5 describes the attributes of the Accounting-Request ON message.

Table 5: The attributes of the Accounting-Request ON message

Attr #	Attribute Name	Description	Content	Presence Requirement
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
30	Called-Station-ID	Identifier for the target network.	APN (UTF-8 encoded)	Optional
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

16.4.6 Accounting Request OFF (optionally sent from GGSN to AAA server)

The table 6 describes the attributes of the Accounting-Request OFF message.

Table 6: The attributes of the Accounting-Request OFF message

Attr #	Attribute Name	Description	Content	Presence Requirement
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
30	Called-Station-ID	Identifier for the target network.	APN (UTF-8 encoded)	Optional
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

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

The table 7 describes the attributes of the Disconnect-Request message.

Table 7: 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	Mandatory
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID	Mandatory

			concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	

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

The table ~~7~~ 8 describes the sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START and Accounting-Request STOP message.

Table ~~7~~8: The sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START and Accounting-Request STOP message

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
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
3	3GPP-PDP Type	Type of PDP context, e.g. IP or PPP	Conditional (mandatory if attribute 7 is present)	Access-Request
4	3GPP-CG-Address	Charging Gateway IP address	Optional	Access-Request, Accounting-Request START
5	3GPP-GPRS-QoS-Profile	QoS profile received	Optional	Access-Request, Accounting-Request START
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
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
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
9	3GPP-GGSN- MCC-MNC	MCC-MNC of the network the GGSN belongs to.	Optional	Access-Request, Accounting-Request START
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, Access-Request STOP
11	3GPP- Session-Stop-Indicator	Indicateds to the AAA server that the last PDP context of a session is released and that	Optional	Accounting Request STOP

		the PDP session has been terminated.		
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
13	3GPP-Charging-Characteristics	Contains the charging characteristics for this PDP Context received in the Create PDP Context Request Message (only available in R99 and later releases)	Optional	Access-Request, Accounting-Request START

3GPP TSG-CN WG3 Meeting #19
Brighton, U.K. 15th - 19th September 2001

Tdoc N3-010476

CR-Form-v4

CHANGE REQUEST

⌘ **29.061** **CR** **033** ⌘ ev **-** ⌘ Current version: **3.7.0** ⌘

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

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

Title:	⌘	Standard method for interworking between GPRS and external PDN using RADIUS
Source:	⌘	CN3
Work item code:	⌘	GPRS
Date:	⌘	19.10.2001
Category:	⌘	**A**
Release:	⌘	R99

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)

Reason for change:	⌘	RADIUS is used between the GGSN and PDN hosting IP applications. The GGSN interworks with AAA server or proxy AAA using the RADIUS protocol to authenticate and authorize users, but also to deliver information related to user sessions. However some applications may want to interwork with the GGSN to trigger the deletion of a PDP context, this option is not specified in the 3GPP specifications today.
Summary of change:	⌘	This CR proposes to use RADIUS Disconnect Request to trigger the termination of a given PDP context in the GGSN.
Consequences if not approved:	⌘	Mutually incompatible proprietary solutions will be developed.

Clauses affected:	⌘	2, 16
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	CR 027 should be implemented on top of this CR.

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.

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.

[1] 3GPP TS 01.04: "Digital cellular telecommunication system (Phase 2+); Abbreviations and acronyms".

[2] 3GPP TS 22.060: "3rd Generation Partnership Project: Technical Specification Group Services and System Aspects; General Packet Radio Service (GPRS): Stage 1 Service Description".

[3] 3GPP TS 23.060: "3rd Generation Partnership Project: Technical Specification Services and System Aspects; General Packet Radio Service (GPRS); Service Description Stage 2".

[4] 3GPP TS 03.61: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Multicast Service Description; Stage 2".

[5] 3GPP TS 03.62: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Group Call Service Description; Stage 2".

[6] 3GPP TS 03.64: "Digital cellular telecommunications system (Phase 2+);General Packet Radio Service (GPRS); Overall description of the Radio interface; Stage 2".

[7] 3GPP TS 04.60: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control / Medium Access Control (RLC/MAC) protocol".

[8] 3GPP TS 04.64: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Logical Link Control (LLC)".

[9] 3GPP TS 24.065: "3rd Generation Partnership Project: Technical Specification Group Core Network; General Packet Radio Service (GPRS); Mobile Station (MS) - Serving GPRS Support Node(SGSN); Subnetwork Dependent Convergence Protocol (SNDCP)".

[10] 3GPP TS 27.060: "3rd Generation Partnership Project: Technical Specification Group Core Network; Packet Domain; Mobile Station (MS) supporting Packet Switched Services".

[11] ITU-T Recommendation E.164: "Numbering plan for the ISDN era".

[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>

[21] IETF RFC 1661 and 1662 (1994): "The Point-to-Point Protocol (PPP)" (STD 51).

[22] IETF RFC 1700 (1994): "Assigned Numbers" (STD 2).3.

[23] UMTS 24.008: "Mobile radio interface layer 3 specification; Core Network Protocols – Stage 3".

[24] UMTS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".

[25] IETF RFC2794 (2000), Pat R. Calhoun and Charles E. Perkins: "Mobile IP Network Address Identifier Extension for IPv4", March 2000.

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

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

[28] IETF RFC2373 (1998): "IP version 6 Addressing Architecture".

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

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

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

[32] IETF RFC1112 (1989), S.E. Deering: "Host extensions for IP multicasting".

[33] IETF RFC2236 (1997), W. Fenner: "Internet Group Management Protocol, Version 2".

[34] IETF RFC2362 (1998), D. Estrin and al: "Protocol Independent Multicast-Sparse Mode (PIM-SM)".

[35] IETF RFC1075 (1988), D. Waitzman and al: "Distance Vector Multicast Routing Protocol".

[36] IETF RFC1585 (1994), J. Moy: "MOSPF"..

[37] IETF RFC2290 (1998), J. Solomon, S. Glass: "Mobile-IPv4 Configuration Option for PPP IPCP ".

[38] IETF RFC2865 (2000), C. Rigney, S. Willens, A. Rubens, W. Simpson: "Remote Authentication Dial In User Service (RADIUS)".

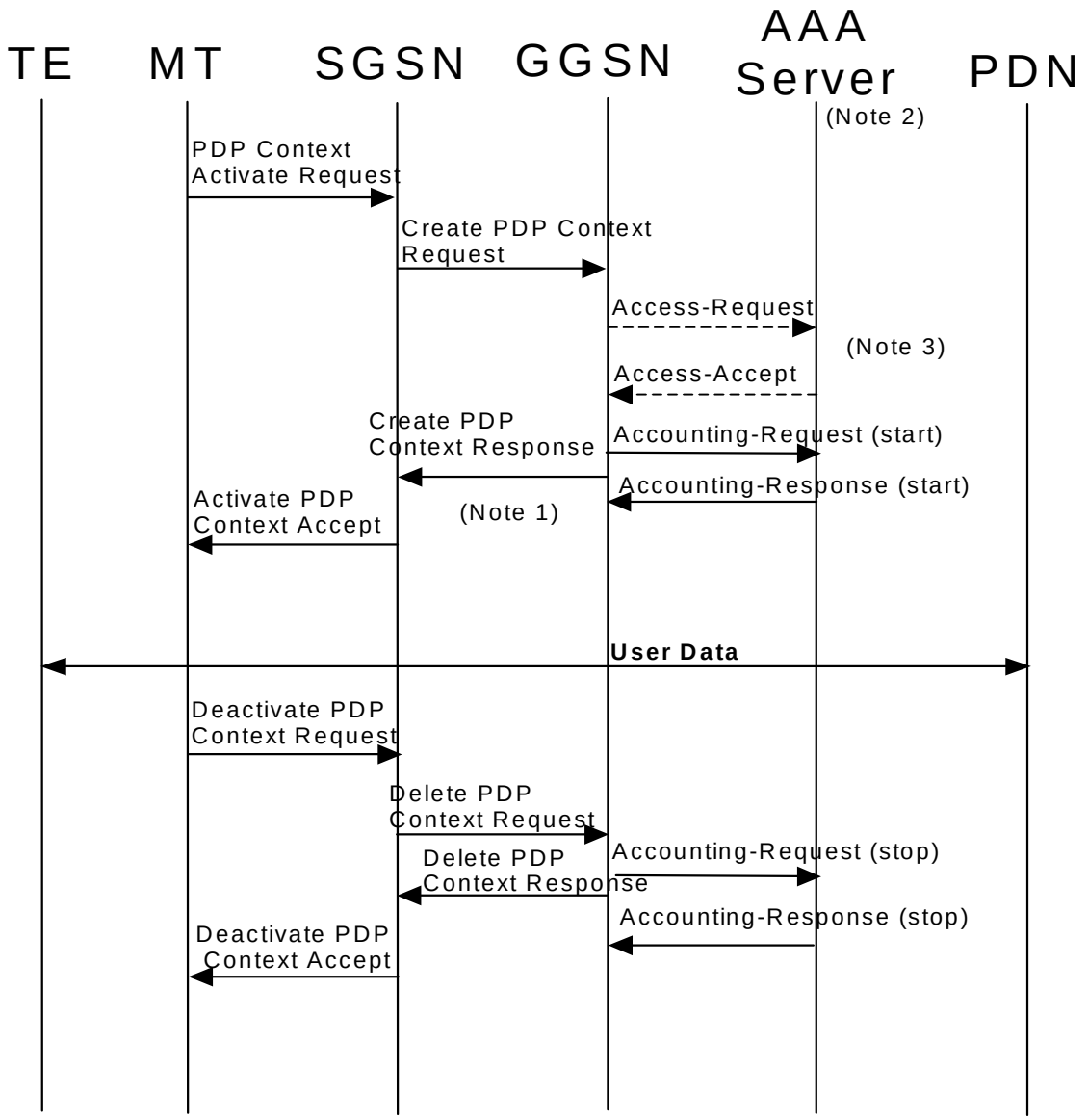
[39] IETF RFC2866 (2000), C. Rigney, Livingston: " RADIUS Accounting ".

[40] IETF RFC2882 (2000), D. Mitton: "Extended RADIUS Practices".

16.3 Authentication and accounting message flows

16.3.1 IP PDP type

The figure 14 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. Both Authentication and Accounting servers may be optional and separately configured for each APN.

NOTE 2: Separate accounting and authentication servers may be used.

NOTE 3: The Access-Request message shall be used for primary PDP context only.

Figure 14: 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 allocation the AAA server shall return the allocated IP address 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, 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. User data forwarding at the GGSN

may not be allowed before the Accounting Response START is received. If this is the case, the GGSN drops user data until the Accounting Response START is received. This is configurable per 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 (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.

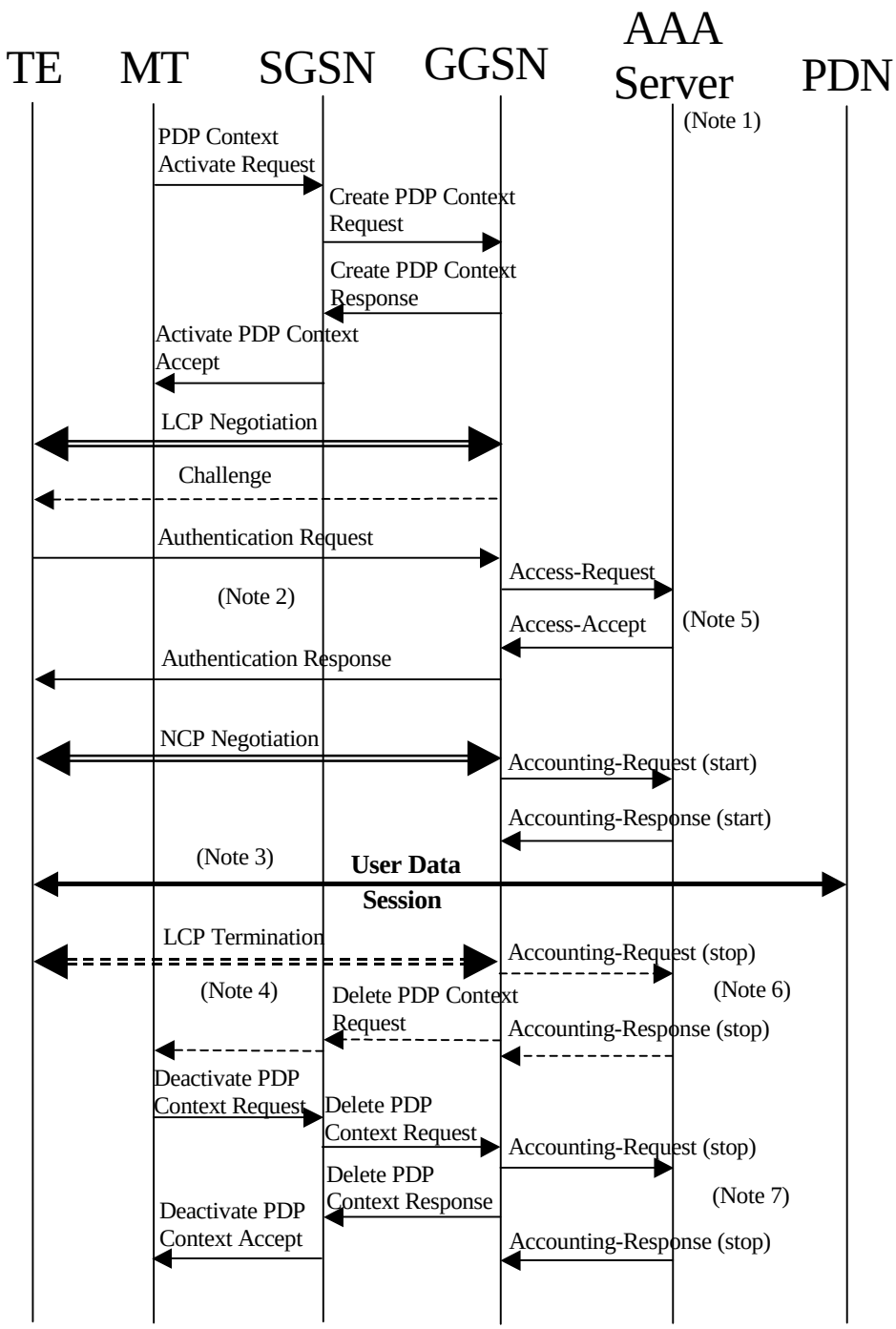
The GGSN may send an Accounting-Request ON message to the AAA server to indicate that a restart has occurred. The AAA server may then release the associated resources.

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 [38].

16.3.2 PPP PDP type

The figure 15 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 this specification.



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: User data may not be allowed before the Accounting Response (START) is received. If this is the case, the GGSN drops user data until the Accounting Response (START) is 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 15: 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 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, 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.

User data forwarding at the GGSN may not be allowed before the Accounting Response START is received. If this is the case, the GGSN drops user data until the Accounting Response START is received. This is configurable per 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 (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 [38].

16.3.3 AAA-Initiated PDP context termination

RADIUS is used as the protocol between the GGSN and a 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 16, the GGSN may react by deleting the corresponding PDP context or silently discard the Diconnect Request message. For more information on RADIUS Disconnect, see [40].

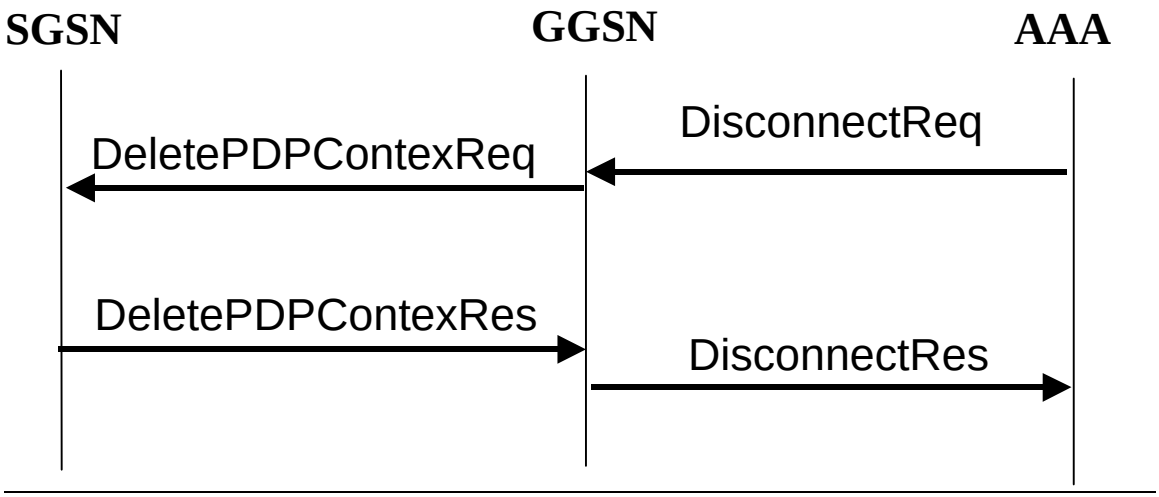


Figure16: PDP Context deletion with RADIUS

16.4 List of RADIUS attributes

The following tables describe the actual content of the RADIUS messages exchanged between the GGSN and the AAA server. Other RADIUS attributes may be used as defined in RADIUS RFC(s). Unless otherwise stated, when the encoding scheme of an attribute is specified as UTF-8 encoding, this shall be interpreted as UTF-8 hexadecimal encoding.

16.4.1 Access-Request message (sent from the GGSN to AAA server)

The table 1 describes the attributes of the Access-Request message.

Table 1: The attributes of the Access-Request message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username is provided by the user (extracted from the Protocol Configuration Options (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.	String	Mandatory
2	User-Password	User password provided by the user if PAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used). If no password is available a generic password, configurable on a per APN basis, shall be present.	String	Conditional Note 1
3	CHAP-Password	User password provided by the user if CHAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used).	String	Conditional Note 2
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed-Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	IP address allocated for this user	IPv4	Conditional
9	Framed-IP-Netmask	Netmask for the user IP address	IPv4	Conditional
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded decimal. Note that there are no leading characters in front of the country code.	Mandatory
60	CHAP-Challenge	Challenge if CHAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used).	String	Conditional Note 2
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according sub-clause 16.4.~~7~~8	See sub-clause 16.4.8~~7~~	Optional except sub-attribute 3 which is conditional

NOTE 1: Shall be present if PAP is used.

NOTE 2: Shall be present if CHAP is used.

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

16.4.2 Access-Accept (sent from AAA server to GGSN)

The table 2 describes the attributes of the Access-Accept message.

Table 2: The attributes of the Access-Accept message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username received in the Access-Request message or a substitute username provided by the AAA server. If the User-Name has been received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed-Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	IP address allocated for this user, if the AAA server is used to allocate IP address.	IPv4	Conditional
9	Framed-IP-Netmask	Netmask for the user IP address, if the AAA server is used to allocate IP netmask.	IPv4	Conditional
12	Framed-IP-MTU	MTU for the user towards this particular APN, MTU shall be less or equal to 1500	String	Optional
25	Class	Identifier to be used in all subsequent accounting messages.	String	Optional (NOTE 4)
27	Session-Timeout	Indicates the timeout value (in seconds) for the user session	32 bit unsigned Integer	Optional
28	Idle-Timeout	Indicates the timeout value (in seconds) for idle user session	32 bit unsigned Integer	Optional
26/311	MS- primary-DNS-server	Contains the primary DNS server address for this APN	Ipv4	Optional
26/311	MS-Secondary-DNS-Server	Contains the secondary DNS server address for this APN	IPv4	Optional
26/311	MS-Primary-NBNS-Server	Contains the primary NetBios name server address for this APN	IPv4	Optional
26/311	MS-Secondary-NBNS-Server	Contains the secondary NetBios server address for this APN	IPv4	Optional
NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message				

16.4.3 Accounting-Request START (sent from GGSN to AAA server)

The table 3 describes the attributes of the Accounting-Request START message.

Table 3: The attributes of the Accounting-Request START 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 received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
4	NAS-IP-Address	GGSN IP address for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional

8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Conditional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded decimal. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Type of accounting message	START	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time (in seconds) of the event generating this Accounting-Request.	32 unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according sub-clause 16.4.8~~7~~.	See sub-clause 16.4.8~~7~~	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.4 Accounting Request STOP (sent from GGSN to AAA server)

The table 4 describes the attributes of the Accounting-Request STOP message.

Table 4: The attributes of the Accounting-Request STOP 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 received in the Access-Accept message, this user-name shall be used in preference to the	String	Optional

		above		
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Optional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Indicates the type of accounting request	STOP	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time of the event generating this Accounting-Request	Second	Optional
42	Acct-Input-Octets	GGSN counted number of octets sent by the user for the PDP context	32 bit unsigned integer	Optional
43	Acct-Output-Octets	GGSN counted number of octets received by the user for the PDP context	32 bit unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
46	Acct-Session-Time	Duration of the session	Second	Optional
47	Acct-Input-Packets	GGSN counted number of packets sent by the user	Packet	Optional
48	Acct-Output-Packets	GGSN counted number of packets received by the user	Packet	Optional
49	Acct-Terminate-Cause	Indicate how the session was terminated	See RFC 2866	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according to sub-clause 16.4.~~7~~8.	See sub-clause 16.4.~~7~~8	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.5 Accounting Request ON (optionally sent from GGSN to AAA server)

The table 5 describes the attributes of the Accounting-Request ON message.

Table 5: The attributes of the Accounting-Request ON message

Attr #	Attribute Name	Description	Content	Presence Requirement
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
30	Called-Station-ID	Identifier for the target network.	APN (UTF-8 encoded)	Optional
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

16.4.6 Accounting Request OFF (optionally sent from GGSN to AAA server)

The table 6 describes the attributes of the Accounting-Request OFF message.

Table 6: The attributes of the Accounting-Request OFF message

Attr #	Attribute Name	Description	Content	Presence Requirement
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
30	Called-Station-ID	Identifier for the target network.	APN (UTF-8 encoded)	Optional
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

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

The table 7 describes the attributes of the Disconnect-Request message.

Table 7: 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	Mandatory
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID	Mandatory

			concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	

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

The table ~~7~~ 8 describes the sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START and Accounting-Request STOP message.

Table ~~7~~8: The sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START and Accounting-Request STOP message

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
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
3	3GPP-PDP Type	Type of PDP context, e.g. IP or PPP	Conditional (mandatory if attribute 7 is present)	Access-Request
4	3GPP-CG-Address	Charging Gateway IP address	Optional	Access-Request, Accounting-Request START
5	3GPP-GPRS-QoS-Profile	QoS profile received	Optional	Access-Request, Accounting-Request START
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
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
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
9	3GPP-GGSN- MCC-MNC	MCC-MNC of the network the GGSN belongs to.	Optional	Access-Request, Accounting-Request START
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, Access-Request STOP
11	3GPP- Session-Stop-Indicator	Indicateds to the AAA server that the last PDP context of a session is released and that	Optional	Accounting Request STOP

		the PDP session has been terminated.		
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
13	3GPP-Charging-Characteristics	Contains the charging characteristics for this PDP Context received in the Create PDP Context Request Message (only available in R99 and later releases)	Optional	Access-Request, Accounting-Request START

3GPP TSG-CN WG3 Meeting #19
Brighton, U.K. 15th - 19th September 2001

Tdoc N3-010477

CR-Form-v4

CHANGE REQUEST

⌘ **09.61** **CR** **A029** ⌘ ev **-** ⌘ Current version: **7.4.0** ⌘

*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 **X**

Title:	⌘	Standard method for interworking between GPRS and external PDN using RADIUS
Source:	⌘	CN3
Work item code:	⌘	GPRS
Date:	⌘	19.10.2001
Category:	⌘	**F**
Release:	⌘	R98

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)

Reason for change:	⌘	RADIUS is used between the GGSN and PDN hosting IP applications. The GGSN interworks with AAA server or proxy AAA using the RADIUS protocol to authenticate and authorize users, but also to deliver information related to user sessions. However some applications may want to interwork with the GGSN to trigger the deletion of a PDP context, this option is not specified in the 3GPP specifications today.
Summary of change:	⌘	This CR proposes to use RADIUS Disconnect Request ~~Accounting Stop~~ to trigger the termination of a given PDP context in the GGSN.
Consequences if not approved:	⌘	Mutually incompatible proprietary solutions will be developed.

Clauses affected:	⌘	2, 16
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	CR A022 should be implemented on top of this CR.

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.

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] GSM 01.04: "Digital cellular telecommunication system (Phase 2+); Abbreviations and acronyms".

[2] GSM 02.60: "Digital cellular telecommunication system (Phase 2+); General Packet Radio Service (GPRS): Stage 1 Service Description".

[3] GSM 03.60: "Digital cellular telecommunication system (Phase 2+); General Packet Radio Service (GPRS); Stage 2 Service Description ".

[4] GSM 03.61: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Multicast Service Description; Stage 2".

[5] GSM 03.62: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Group Call Service Description; Stage 2".

[6] GSM 03.64: "Digital cellular telecommunications system (Phase 2+);General Packet Radio Service (GPRS); Overall description of the Radio interface; Stage 2".

[7] GSM 04.60: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control / Medium Access Control (RLC/MAC) protocol".

[8] GSM 04.64: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Logical Link Control (LLC)".

[9] GSM 04.65: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Subnetwork Dependent Convergence Protocol (SNDCP)".

[10] GSM 07.60: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station (MS) supporting GPRS".

[11] CCITT Recommendation E.164: "Numbering plan for the ISDN era".

[12] CCITT Recommendation X.25: "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".

[13] CCITT Recommendation X.75: "Packet-switched signalling system between public networks providing data transmission services".

[14] CCITT Recommendation X.121: "International Numbering Plan for Public Data Networks".

[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] Bellcore GR-000301 Issue 2 December 1997; "Public Packet Switched Network Generic Requirements (PPSNGR)".

[21] IETF RFC 1661 and 1662 (1994): "The Point-to-Point Protocol (PPP)" (STD 51).

[22] IETF RFC 1700 (1994): "Assigned Numbers" (STD 2).3

[23] IETF RFC2865 (2000), C. Rigney, S. Willens, A. Rubens, W. Simpson: "Remote Authentication Dial In User Service (RADIUS)".

[24] IETF RFC2866 (2000), C. Rigney, Livingston: " RADIUS Accounting ".

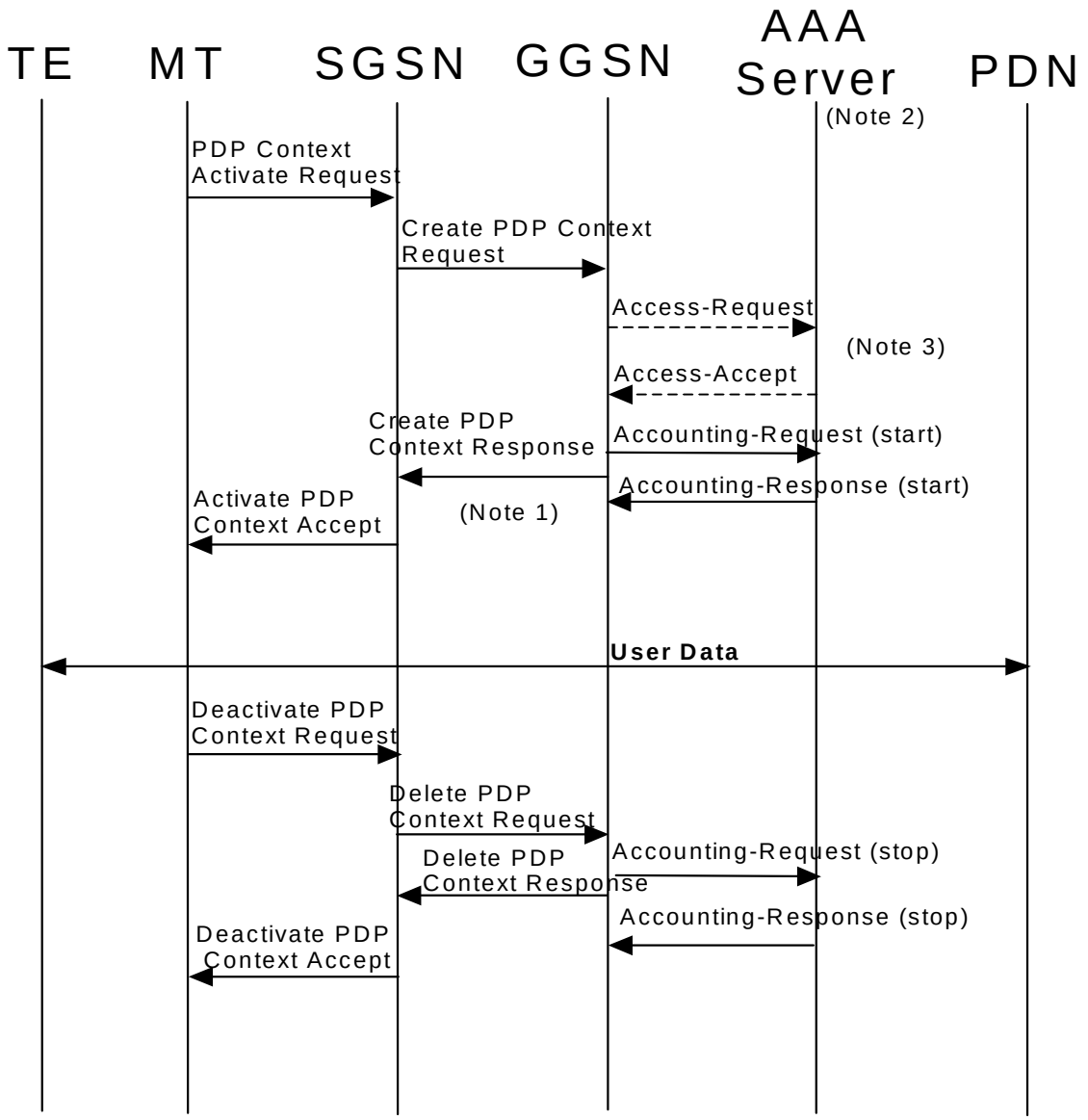
[25] 3GPP TS 23.003: "3rd Generation Partnership Project; Technical Specification Group Core Network; Numbering, addressing and identification".

[26] IETF RFC2882 (2000), D. Mitton: "Extended RADIUS Practices".

16.3 Authentication and accounting message flows

16.3.1 IP PDP type

The figure 14 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. Both Authentication and Accounting servers may be optional and separately configured for each APN.

NOTE 2: Separate accounting and authentication servers may be used.

NOTE 3: The Access-Request message shall be used for primary PDP context only.

Figure 14: 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 allocation the AAA server shall return the allocated IP address 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, 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. User data forwarding at the GGSN

may not be allowed before the Accounting Response START is received. If this is the case, the GGSN drops user data until the Accounting Response START is received. This is configurable per 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 (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.

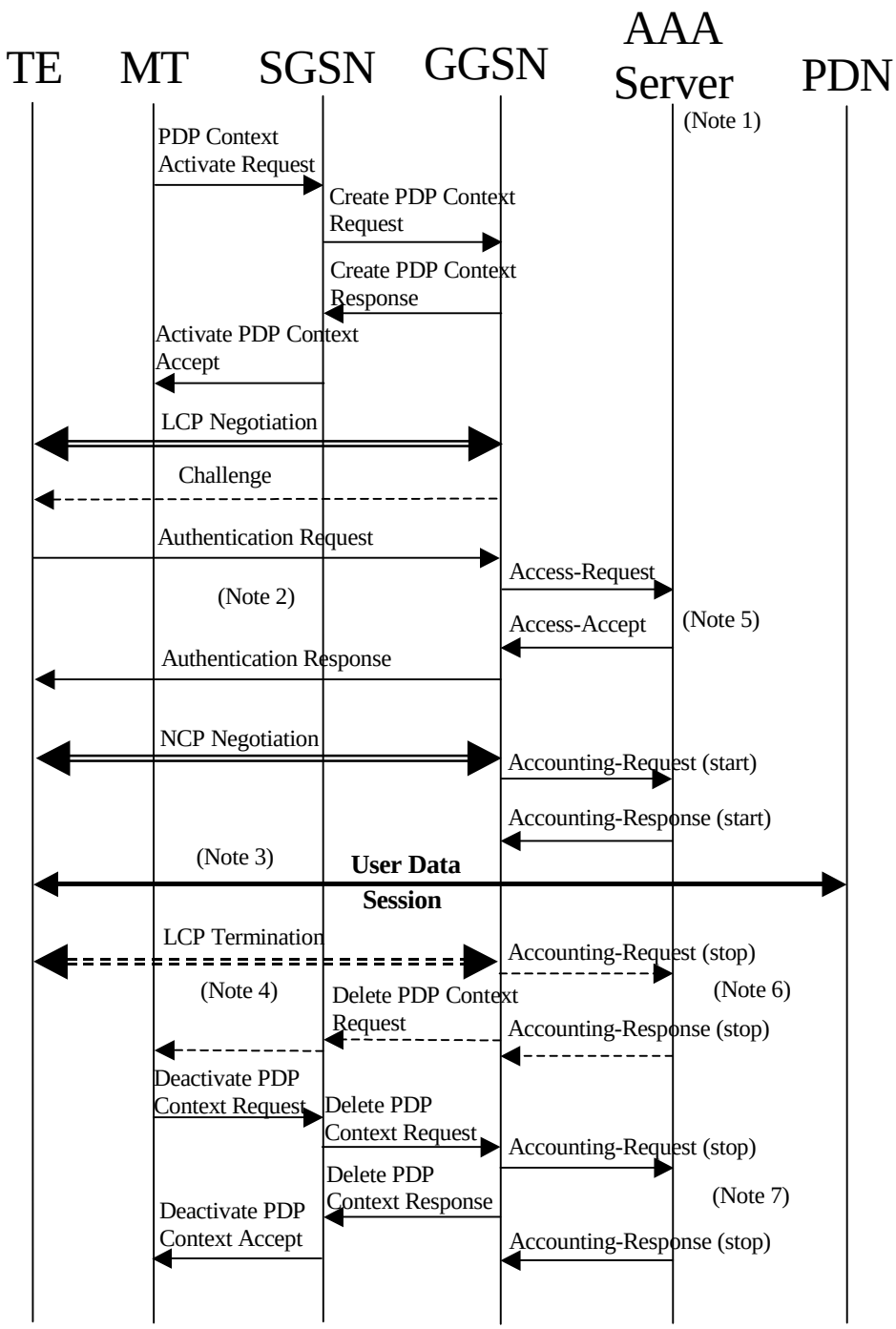
The GGSN may send an Accounting-Request ON message to the AAA server to indicate that a restart has occurred. The AAA server may then release the associated resources.

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 [38].

16.3.2 PPP PDP type

The figure 15 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 this specification.



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: User data may not be allowed before the Accounting Response (START) is received. If this is the case, the GGSN drops user data until the Accounting Response (START) is 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 15: 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 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, 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.

User data forwarding at the GGSN may not be allowed before the Accounting Response START is received. If this is the case, the GGSN drops user data until the Accounting Response START is received. This is configurable per 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 (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 [38].

16.3.3 AAA-Initiated PDP context termination

RADIUS is used as the protocol between the GGSN and a 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 16, the GGSN may react by deleting the corresponding PDP context or silently discard the Diconnect Request message. For more information on RADIUS Disconnect, see [26].

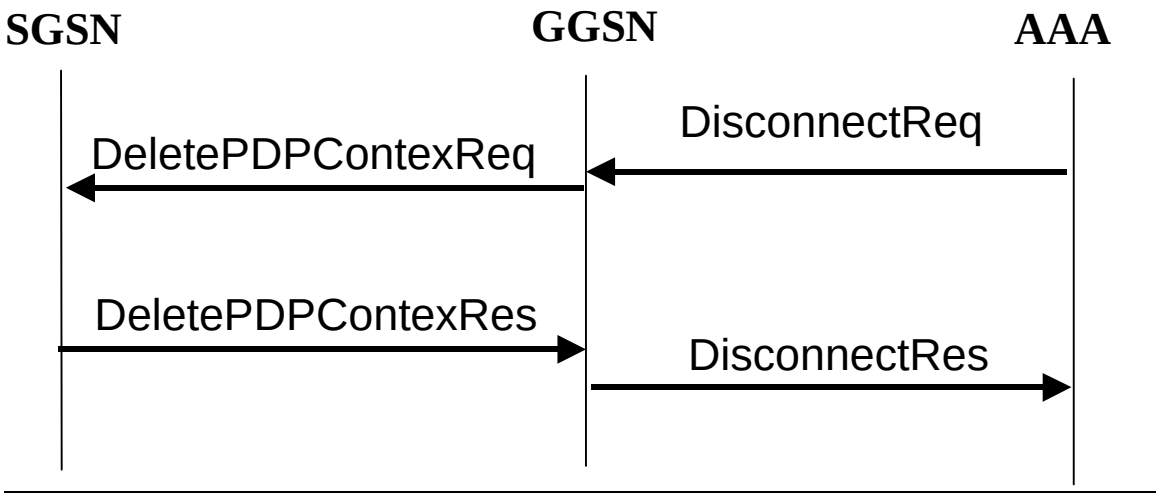


Figure16: PDP Context deletion with RADIUS

16.4 List of RADIUS attributes

The following tables describe the actual content of the RADIUS messages exchanged between the GGSN and the AAA server. Other RADIUS attributes may be used as defined in RADIUS RFC(s). Unless otherwise stated, when the encoding scheme of an attribute is specified as UTF-8 encoding, this shall be interpreted as UTF-8 hexadecimal encoding.

16.4.1 Access-Request message (sent from the GGSN to AAA server)

The table 1 describes the attributes of the Access-Request message.

Table 1: The attributes of the Access-Request message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username is provided by the user (extracted from the Protocol Configuration Options (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.	String	Mandatory
2	User-Password	User password provided by the user if PAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used). If no password is available a generic password, configurable on a per APN basis, shall be present.	String	Conditional Note 1
3	CHAP-Password	User password provided by the user if CHAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used).	String	Conditional Note 2
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed-Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	IP address allocated for this user	IPv4	Conditional
9	Framed-IP-Netmask	Netmask for the user IP address	IPv4	Conditional
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded decimal. Note that there are no leading characters in front of the country code.	Mandatory
60	CHAP-Challenge	Challenge if CHAP is used (extracted from the PCO field of the Create PDP Context Request message) or PPP authentication phase (if PPP PDP type is used).	String	Conditional Note 2
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according sub-clause 16.4.~~7~~8	See sub-clause 16.4.8~~7~~	Optional except sub-attribute 3 which is conditional

NOTE 1: Shall be present if PAP is used.

NOTE 2: Shall be present if CHAP is used.

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

16.4.2 Access-Accept (sent from AAA server to GGSN)

The table 2 describes the attributes of the Access-Accept message.

Table 2: The attributes of the Access-Accept message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username received in the Access-Request message or a substitute username provided by the AAA server. If the User-Name has been received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed-Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	IP address allocated for this user, if the AAA server is used to allocate IP address.	IPv4	Conditional
9	Framed-IP-Netmask	Netmask for the user IP address, if the AAA server is used to allocate IP netmask.	IPv4	Conditional
12	Framed-IP-MTU	MTU for the user towards this particular APN, MTU shall be less or equal to 1500	String	Optional
25	Class	Identifier to be used in all subsequent accounting messages.	String	Optional (NOTE 4)
27	Session-Timeout	Indicates the timeout value (in seconds) for the user session	32 bit unsigned Integer	Optional
28	Idle-Timeout	Indicates the timeout value (in seconds) for idle user session	32 bit unsigned Integer	Optional
26/311	MS- primary-DNS-server	Contains the primary DNS server address for this APN	Ipv4	Optional
26/311	MS-Secondary-DNS-Server	Contains the secondary DNS server address for this APN	IPv4	Optional
26/311	MS-Primary-NBNS-Server	Contains the primary NetBios name server address for this APN	IPv4	Optional
26/311	MS-Secondary-NBNS-Server	Contains the secondary NetBios server address for this APN	IPv4	Optional
NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message				

16.4.3 Accounting-Request START (sent from GGSN to AAA server)

The table 3 describes the attributes of the Accounting-Request START message.

Table 3: The attributes of the Accounting-Request START 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 received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
4	NAS-IP-Address	GGSN IP address for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional

8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Conditional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded decimal. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Type of accounting message	START	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time (in seconds) of the event generating this Accounting-Request.	32 unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according sub-clause 16.4.8~~7~~.	See sub-clause 16.4.8~~7~~	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.4 Accounting Request STOP (sent from GGSN to AAA server)

The table 4 describes the attributes of the Accounting-Request STOP message.

Table 4: The attributes of the Accounting-Request STOP 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 received in the Access-Accept message, this user-name shall be used in preference to the	String	Optional

		above		
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Optional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Indicates the type of accounting request	STOP	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time of the event generating this Accounting-Request	Second	Optional
42	Acct-Input-Octets	GGSN counted number of octets sent by the user for the PDP context	32 bit unsigned integer	Optional
43	Acct-Output-Octets	GGSN counted number of octets received by the user for the PDP context	32 bit unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
46	Acct-Session-Time	Duration of the session	Second	Optional
47	Acct-Input-Packets	GGSN counted number of packets sent by the user	Packet	Optional
48	Acct-Output-Packets	GGSN counted number of packets received by the user	Packet	Optional
49	Acct-Terminate-Cause	Indicate how the session was terminated	See RFC 2866	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according to sub-clause 16.4.~~7~~8.	See sub-clause 16.4.~~7~~8	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.5 Accounting Request ON (optionally sent from GGSN to AAA server)

The table 5 describes the attributes of the Accounting-Request ON message.

Table 5: The attributes of the Accounting-Request ON message

Attr #	Attribute Name	Description	Content	Presence Requirement
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
30	Called-Station-ID	Identifier for the target network.	APN (UTF-8 encoded)	Optional
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.				

16.4.6 Accounting Request OFF (optionally sent from GGSN to AAA server)

The table 6 describes the attributes of the Accounting-Request OFF message.

Table 6: The attributes of the Accounting-Request OFF message

Attr #	Attribute Name	Description	Content	Presence Requirement
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
30	Called-Station-ID	Identifier for the target network.	APN (UTF-8 encoded)	Optional
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.				

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

The table 7 describes the attributes of the Disconnect-Request message.

Table 7: 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	Mandatory
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID	Mandatory

			concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	

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

The table ~~7~~ 8 describes the sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START and Accounting-Request STOP message.

Table ~~7~~8: The sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START and Accounting-Request STOP message

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
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
3	3GPP-PDP Type	Type of PDP context, e.g. IP or PPP	Conditional (mandatory if attribute 7 is present)	Access-Request
4	3GPP-CG-Address	Charging Gateway IP address	Optional	Access-Request, Accounting-Request START
5	3GPP-GPRS-QoS-Profile	QoS profile received	Optional	Access-Request, Accounting-Request START
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
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
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
9	3GPP-GGSN- MCC-MNC	MCC-MNC of the network the GGSN belongs to.	Optional	Access-Request, Accounting-Request START
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, Access-Request STOP
11	3GPP- Session-Stop-Indicator	Indicateds to the AAA server that the last PDP context of a session is released and that	Optional	Accounting Request STOP

		the PDP session has been terminated.		
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

3GPP TSG-CN WG3 Meeting #19
Brighton, U.K. 15th - 19th September 2001

Tdoc N3-010478

CR-Form-v4

CHANGE REQUEST

⌘ **09.61** **CR** **A030** ⌘ ev **0** ⌘ Current version: **6.5.0** ⌘

*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:	⌘	Standard method for interworking between GPRS and external PDN using RADIUS
Source:	⌘	CN3
Work item code:	⌘	GPRS
Date:	⌘	19.10.2001
Category:	⌘	**F**
Release:	⌘	R97

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)*

Reason for change:	⌘	RADIUS is used between the GGSN and PDN hosting IP applications. The GGSN interworks with AAA server or proxy AAA using the RADIUS protocol to authenticate and authorize users, but also to deliver information related to user sessions. However some applications may want to interwork with the GGSN to trigger the deletion of a PDP context, this option is not specified in the 3GPP specifications today.
Summary of change:	⌘	This CR proposes to use RADIUS Disconnect Request to trigger the termination of a given PDP context in the GGSN.
Consequences if not approved:	⌘	Mutually incompatible proprietary solutions will be developed.

Clauses affected:	⌘	2, 16
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications
	⌘	
Other comments:	⌘	CR A021 should be implemented on top of this CR.

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.

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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] GSM 01.04: "Digital cellular telecommunication system (Phase 2+); Abbreviations and acronyms".

[2] GSM 02.60: "Digital cellular telecommunication system (Phase 2+); General Packet Radio Service (GPRS): Stage 1 Service Description".

[3] GSM 03.60: "Digital cellular telecommunication system (Phase 2+); General Packet Radio Service (GPRS); Stage 2 Service Description ".

[4] GSM 03.61: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Multicast Service Description; Stage 2".

[5] GSM 03.62: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Group Call Service Description; Stage 2".

[6] GSM 03.64: "Digital cellular telecommunications system (Phase 2+);General Packet Radio Service (GPRS); Overall description of the Radio interface; Stage 2".

[7] GSM 04.60: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control / Medium Access Control (RLC/MAC) protocol".

[8] GSM 04.64: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Logical Link Control (LLC)".

[9] GSM 04.65: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Subnetwork Dependent Convergence Protocol (SNDCP)".

[10] GSM 07.60: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station (MS) supporting GPRS".

[11] CCITT Recommendation E.164: "Numbering plan for the ISDN era".

[12] CCITT Recommendation X.25: "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".

[13] CCITT Recommendation X.75: "Packet-switched signalling system between public networks providing data transmission services".

[14] CCITT Recommendation X.121: "International Numbering Plan for Public Data Networks".

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

[21] IETF RFC2865 (2000), C. Rigney, S. Willens, A. Rubens, W. Simpson: "Remote Authentication Dial In User Service (RADIUS)".

[22] IETF RFC2866 (2000), C. Rigney, Livingston: " RADIUS Accounting ".

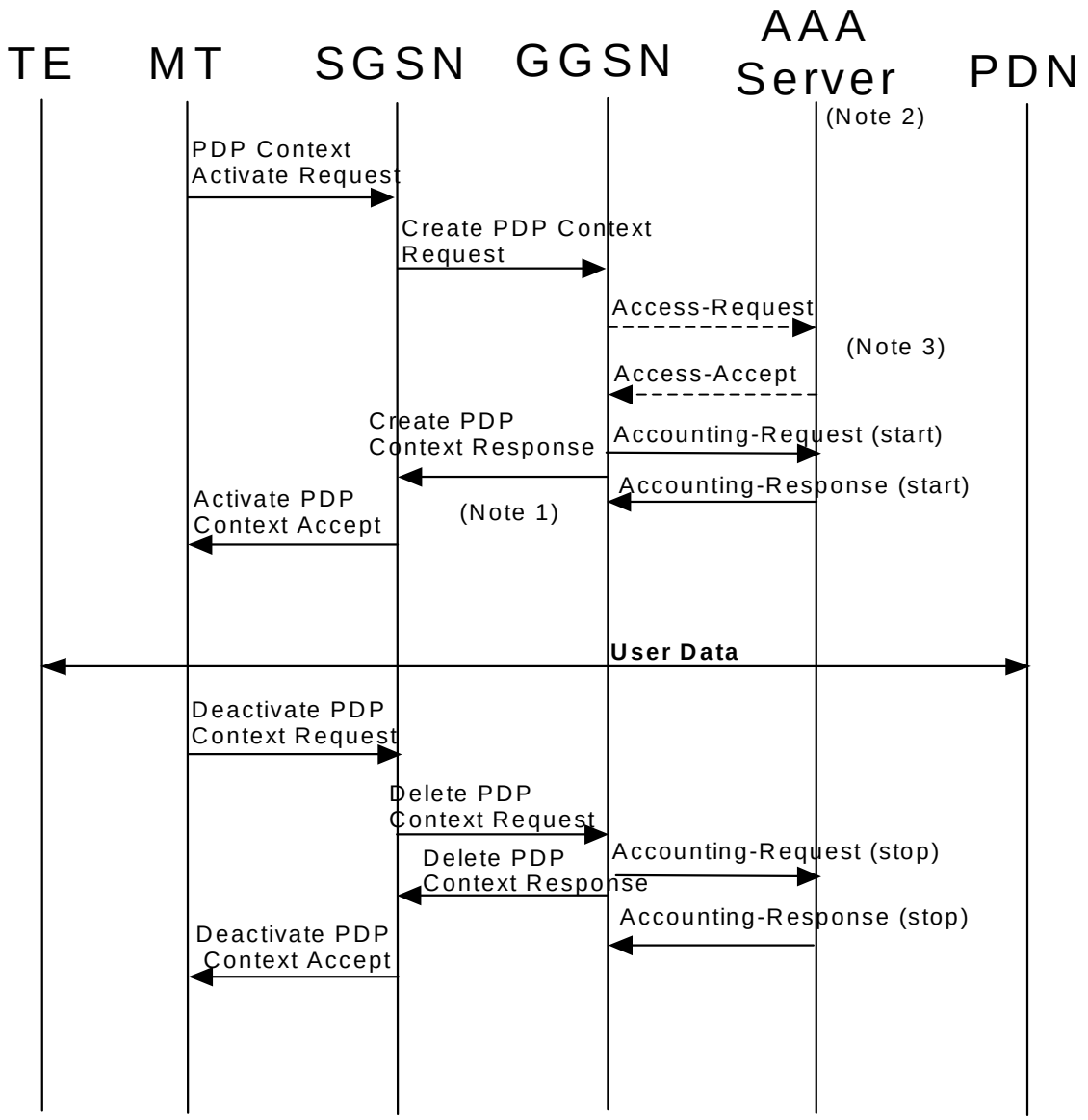
[23] 3GPP TS 23.003: "3rd Generation Partnership Project; Technical Specification Group Core Network; Numbering, addressing and identification".

[24] IETF RFC2882 (2000), D. Mitton: "Extended RADIUS Practices".

16.3 Authentication and accounting message flows

16.3.1 IP PDP type

The figure 14 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. Both Authentication and Accounting servers may be optional and separately configured for each APN.

NOTE 2: Separate accounting and authentication servers may be used.

NOTE 3: The Access-Request message shall be used for primary PDP context only.

Figure 14: 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 allocation the AAA server shall return the allocated IP address 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, 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. User data forwarding at the GGSN

may not be allowed before the Accounting Response START is received. If this is the case, the GGSN drops user data until the Accounting Response START is received. This is configurable per 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 (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 [21].

16.3.2 Void

16.3.3 AAA-Initiated PDP context termination

RADIUS is used as the protocol between the GGSN and a 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 16, the GGSN may react by deleting the corresponding PDP context or silently discard the Diconnect Request message. For more information on RADIUS Disconnect, see [24].

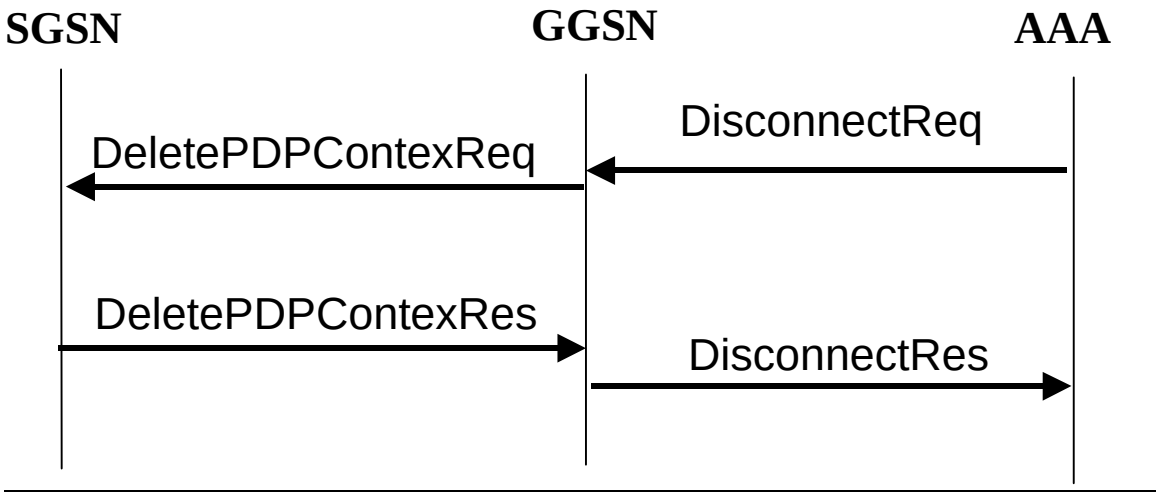


Figure16: PDP Context deletion with RADIUS

16.4 List of RADIUS attributes

The following tables describe the actual content of the RADIUS messages exchanged between the GGSN and the AAA server. Other RADIUS attributes may be used as defined in RADIUS RFC(s). Unless otherwise stated, when the encoding scheme of an attribute is specified as UTF-8 encoding, this shall be interpreted as UTF-8 hexadecimal encoding.

Access-Request message (sent from the GGSN to AAA server)

The table 1 describes the attributes of the Access-Request message.

Table 1: The attributes of the Access-Request message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username is provided by the user (extracted from the Protocol Configuration Options (PCO) field of the Create PDP Context Request message). If no username is available a generic username, configurable on a per APN basis, shall be present.	String	Mandatory
2	User-Password	User password provided by the user if PAP is used (extracted from the PCO field of the Create PDP Context Request message). If no password is available a generic password, configurable on a per APN basis, shall be present.	String	Conditional Note 1
3	CHAP-Password	User password provided by the user if CHAP is used (extracted from the PCO field of the Create PDP Context Request message).	String	Conditional Note 2
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed-Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	IP address allocated for this user	IPv4	Conditional
9	Framed-IP-Netmask	Netmask for the user IP address	IPv4	Conditional
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded decimal. Note that there are no leading characters in front of the country code.	Mandatory
60	CHAP-Challenge	Challenge if CHAP is used (extracted from the PCO field of the Create PDP Context Request message).	String	Conditional Note 2
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according sub-clause 16.4.7	See sub-clause 16.4.7	Optional except sub-attribute 3 which is conditional

NOTE 1: Shall be present if PAP is used.

NOTE 2: Shall be present if CHAP is used.

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

16.4.2 Access-Accept (sent from AAA server to GGSN)

The table 2 describes the attributes of the Access-Accept message.

Table 2: The attributes of the Access-Accept message

Attr #	Attribute Name	Description	Content	Presence Requirement
1	User-Name	Username received in the Access-Request message or a substitute username provided by the AAA server. If the User-Name has been received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed-Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	IP address allocated for this user, if the AAA server is used to allocate IP address.	IPv4	Conditional
9	Framed-IP-Netmask	Netmask for the user IP address, if the AAA server is used to allocate IP netmask.	IPv4	Conditional
12	Framed-IP-MTU	MTU for the user towards this particular APN, MTU shall be less or equal to 1500	String	Optional
25	Class	Identifier to be used in all subsequent accounting messages.	String	Optional (NOTE 4)
27	Session-Timeout	Indicates the timeout value (in seconds) for the user session	32 bit unsigned Integer	Optional
28	Idle-Timeout	Indicates the timeout value (in seconds) for idle user session	32 bit unsigned Integer	Optional
26/311	MS- primary-DNS-server	Contains the primary DNS server address for this APN	Ipv4	Optional
26/311	MS-Secondary-DNS-Server	Contains the secondary DNS server address for this APN	IPv4	Optional
26/311	MS-Primary-NBNS-Server	Contains the primary NetBios name server address for this APN	IPv4	Optional
26/311	MS-Secondary-NBNS-Server	Contains the secondary NetBios server address for this APN	IPv4	Optional
NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message				

16.4.3 Accounting-Request START (sent from GGSN to AAA server)

The table 3 describes the attributes of the Accounting-Request START message.

Table 3: The attributes of the Accounting-Request START 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). If no username is available a generic username, configurable on a per APN basis, shall be present. If the User-Name has been received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
4	NAS-IP-Address	GGSN IP address for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Conditional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded decimal. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Type of accounting message	START	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time (in seconds) of the event generating this Accounting-Request.	32 unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according sub-clause 16.4.7.	See sub-clause 16.4.7	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.4 Accounting Request STOP (sent from GGSN to AAA server)

The table 4 describes the attributes of the Accounting-Request STOP message.

Table 4: The attributes of the Accounting-Request STOP 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). If no username is available a generic username, configurable on a per APN basis, shall be present. If the User-Name has been received in the Access-Accept message, this user-name shall be used in preference to the above	String	Optional
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3
6	Service-Type	Indicates the type of service for this user	Framed	Optional
7	Framed Protocol	Indicates the type of protocol for this user	7 (GPRS PDP Context)	Optional
8	Framed-IP-Address	User IP address	IPv4	Mandatory
25	Class	Received in the access accept	String	Optional (NOTE 4)
30	Called-Station-Id	Identifier for the target network	APN (UTF-8 encoded)	Mandatory
31	Calling-Station-Id	Identifier for the MS	MSISDN in international format according to 3GPP TS 23.003, UTF-8 encoded. Note that there are no leading characters in front of the country code.	Mandatory
40	Acct-Status-Type	Indicates the type of accounting request	STOP	Mandatory
41	Acct-Delay-Time	Indicates how many seconds the GGSN has been trying to send this record for, and can be subtracted from the time of arrival on the AAA server to find the approximate time of the event generating this Accounting-Request	Second	Optional
42	Acct-Input-Octets	GGSN counted number of octets sent by the user for the PDP context	32 bit unsigned integer	Optional
43	Acct-Output-Octets	GGSN counted number of octets received by the user for the PDP context	32 bit unsigned integer	Optional
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory
45	Acct-Authentic	Authentication method	RADIUS or LOCAL	Optional
46	Acct-Session-Time	Duration of the session	Second	Optional
47	Acct-Input-Packets	GGSN counted number of packets sent by the user	Packet	Optional

48	Acct-Output-Packets	GGSN counted number of packets received by the user	Packet	Optional
49	Acct-Terminate-Cause	Indicate how the session was terminated	See RFC 2866	Optional
61	NAS-Port-Type	Port type for the GGSN	As per RFC 2865	Optional
26/10415	3GPP Vendor-Specific	Sub-attributes according to sub-clause 16.4.7.	See sub-clause 16.4.7	Optional except sub-attribute 3 which is conditional

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

NOTE 4: The presence of this attribute is conditional upon this attribute being received in the Access-Accept message

16.4.5 Accounting Request ON (optionally sent from GGSN to AAA server)

The table 5 describes the attributes of the Accounting-Request ON message.

Table 5: The attributes of the Accounting-Request ON message

Attr #	Attribute Name	Description	Content	Presence Requirement
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
30	Called-Station-ID	Identifier for the target network.	APN (UTF-8 encoded)	Optional
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

16.4.6 Accounting Request OFF (optionally sent from GGSN to AAA server)

The table 6 describes the attributes of the Accounting-Request OFF message.

Table 6: The attributes of the Accounting-Request OFF message

Attr #	Attribute Name	Description	Content	Presence Requirement
4	NAS-IP-Address	IP address of the GGSN for communication with the AAA server.	IPv4	Conditional Note 3
30	Called-Station-ID	Identifier for the target network.	APN (UTF-8 encoded)	Optional
32	NAS-Identifier	Hostname of the GGSN for communication with the AAA server.	String	Conditional Note 3

NOTE 3: Either NAS-IP-Address or NAS-Identifier shall be present.

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

The table 7 describes the attributes of the Disconnect-Request message.

Table 7: 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	String	Optional

		message). 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		
8	Framed-IP-Address	User IP address	IPv4	Mandatory
44	Acct-Session-Id	User session identifier.	GGSN IP address and Charging-ID concatenated in a UTF-8 encoded hexadecimal. NOTE: The GGSN IP address is the same as that used in the GCDRs.	Mandatory

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

The table ~~7~~ 8 describes the sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START and Accounting-Request STOP message.

Table ~~7~~8: The sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START and Accounting-Request STOP message

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
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
3	3GPP-PDP Type	Type of PDP context, e.g. IP	Conditional (mandatory if attribute 7 is present)	Access-Request
4	3GPP-CG-Address	Charging Gateway IP address	Optional	Access-Request, Accounting-Request START
5	3GPP-GPRS-QoS-Profile	QoS profile received	Optional	Access-Request, Accounting-Request START
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
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
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
9	3GPP-GGSN- MCC-MNC	MCC-MNC of the network the GGSN belongs to.	Optional	Access-Request, Accounting-Request START
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, Access-Request STOP
11	3GPP- Session-Stop-Indicator	Indicateds to the AAA server that the last PDP context of a session is released and that	Optional	Accounting Request STOP

		the PDP session has been terminated.		
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