3GPP TSG-CN Meeting #26 **NP-040559**
8th – 10th December 2004. Athens, Greece.

Source: **TSG CN WG3**

Title: **CRs to Rel-6 on Work Item "TEI-6"(Pack2)**

Agenda item: **9.21**

Document for: **APPROVAL**

Introduction:

This document contains 2 CRs to Rel-6 on Work Item "TEI-6"(Pack2) that have been agreed by TSG CN WG3, and are forwarded to TSG CN Plenary for approval.

WG_tdoc	Spec	CR	R	Cat	Title	Rel	C_Ver	Work Item
N3-040847	29.061	138	1	B	RADIUS Enhancements on the Gi interface for QoS information (Negotiated DSCP)	Rel-6	6.2.0	TEI
N3-040846	29.061	139	1	B	RADIUS Enhancements on the Gi interface to enable QoS correlation (Packet Filters)	Rel-6	6.2.0	TEI

3GPP TSG-CN WG3 Meeting #34 **Tdoc N3-040846**

Seoul, Korea. 15th to 19th November 2004.

CR-Form-v7

CHANGE REQUEST

⌘ **29.061** **CR** 139 ⌘ **rev** **1** ⌘ Current version: **6.2.0** ⌘

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

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

Title:	⌘	RADIUS Enhancements on the Gi interface to enable QoS correlation (Packet Filters)
Source:	⌘	Cisco Systems, Siemens, Vodafone, Orange
Work item code:	⌘	TEI_6
Date:	⌘	15/11/2004
Category:	⌘	**B**
Release:	⌘	Rel-6

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Operators use the information provided in the RADIUS messages by the GGSN to perform authentication, authorization and billing function. In order to allow the operator to correctly correlate QoS with the appropriate session when IMS, SBLP or other services are used, additional information is needed on the GGSN RADIUS interface.
Summary of change:	⌘	To export the required information, a new 3GPP Vendor Specific Attibute is defined: *3GPP-Packet-Filter*: this attribute contains the packet filters used on the GGSN for this PDP context. These packet filters may come from the TFT provided by the MS, or retrieved from the PDF via Go (if SBLP is used). This attribute can optionaly be sent in the Accounting Request START, Accounting Request STOP and Accounting Request Interim-Update. Note: The forwarding of this optional attribute is not recommended for an inter-operator interface for security reason.
Consequences if not approved:	⌘	QoS correlation may not be consistent.

Clauses affected:	⌘	16.4.7

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

Other comments: ⌘

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

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

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

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

Change in Clause 16.4.7

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

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

Table 7: List of the 3GPP Vendor-Specific sub-attributes

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

Sub-attr #	Sub-attribute Name	Description	Presence Requirement	Associated attribute (Location of Sub-attr)
				Interim-Update
6	3GPP-SGSN-Address	SGSN IP address that is used by the GTP control plane for the handling of control messages. It may be used to identify the PLMN to which the user is attached.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
7	3GPP-GGSN-Address	GGSN IP address that is used by the GTP control plane for the context establishment. It is the same as the GGSN IP address used in the GCDRs.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
8	3GPP-IMSI-MCC-MNC	MCC and MNC extracted from the user's IMSI (first 5 or 6 digits, as applicable from the presented IMSI).	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
9	3GPP-GGSN- MCC-MNC	MCC-MNC of the network the GGSN belongs to.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
10	3GPP-NSAPI	Identifies a particular PDP context for the associated PDN and MSISDN/IMSI from creation to deletion.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP Accounting-Request Interim-Update
11	3GPP- Session-Stop-Indicator	Indicates to the AAA server that the last PDP context of a session is released and that the PDP session has been terminated.	Optional	Accounting Request STOP
12	3GPP- Selection-Mode	Contains the Selection mode for this PDP Context received in the Create PDP Context Request Message	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
13	3GPP-Charging-Characteristics	Contains the charging characteristics for this PDP Context received in the Create PDP Context Request Message (only available in R99 and later releases)	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update

Sub-attr #	Sub-attribute Name	Description	Presence Requirement	Associated attribute (Location of Sub-attr)
14	3GPP-CG-IPv6-Address	Charging Gateway IPv6 address	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
15	3GPP-SGSN-IPv6-Address	SGSN IPv6 address that is used by the GTP control plane for the handling of control messages. It may be used to identify the PLMN to which the user is attached.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
16	3GPP-GGSN-IPv6-Address	GGSN IPv6 address that is used by the GTP control plane for the context establishment.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
17	3GPP- IPv6-DNS-Servers	List of IPv6 addresses of DNS servers for an APN	Optional	Access-Accept
18	3GPP-SGSN-MCC-MNC	MCC and MNC extracted from the RAI within the Create PDP Context Request or Update PDP Context Request message.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
19	3GPP-Teardown-Indicator	Indicate to the GGSN that all PDP contexts for this particular user and sharing the same user session need to be deleted.	Optional	Disconnect Request
20	3GPP-IMEISV	International Mobile Equipment Id and its Software Version	Optional	Accounting-Request START, Access-Request
21	3GPP-Packet-Filter	Packet Filter used for this PDP context	Optional	Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update

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

Bits

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

n ≥ 7

3GPP Vendor Id = 10415

The string part is encoded as follows:

Bits

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

m ≥ 2 and m ≤ 248

The 3GPP specific attributes encoding is clarified below.

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

Bits

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

3GPP Type: 1

n ≤15

Length: m ≤ 17

IMSI value: Text:

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

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

Bits

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

3GPP Type: 2

Length: 6

Charging ID value: 32 bits unsigned integer

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

Bits

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

3GPP Type: 3

Length: 6

PDP type value: Unsigned 32 bits integer

PDP type octet possible values:

0 = IPv4

1 = PPP

2 = IPv6

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

Bits

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

3GPP Type: 4

Length: 6

Charging GW address value: Address

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

Bits

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

3GPP Type: 5

Length: L ≤ 33 (release 5) or L ≤ 27 (release 99) or L = 11 (release 98)

QoS profile value: Text

UTF-8 encoded QoS profile syntax:

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

<Release indicator> = UTF-8 encoded number :

"98" = Release 98

"99"= Release 99

"05"= Release 5

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

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

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

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

The release 5 QoS profile data is 14 octets long, which results in a 28 octets UTF-8 encoded string.

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

Bits

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

3GPP Type: 6

Length: 6

SGSN address value: Address

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

Bits

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

3GPP Type: 7

Length: 6

GGSN address value: Address

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

Bits

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

3GPP Type: 8

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

MS address value: text

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

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

Bits

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

3GPP Type: 9

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

GGSN address value: text

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

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

Bits

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

3GPP Type: 10

Length: 3

NSAPI value: text

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

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

Bits

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

3GPP Type: 11

Length: 3

Value is set to all 1.

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

Bits

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

3GPP Type: 12

Length: 3

Selection mode value: Text

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

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

Bits

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

3GPP Type: 13

Length: 6

Charging characteristics value: Text

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

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

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

Bits

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

3GPP Type: 14

Length: 18

Charging GW IPv6 address value: IPv6 Address

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

Bits

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

3GPP Type: 15

Length: 18

SGSN IPv6 address value: IPv6 Address

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

Bits

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

3GPP Type: 16

Length: 18

GGSN IPv6 address value: IPv6 Address

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

Bits

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

3GPP Type: 17

Length: m = n × 16 + 2; n ≥ 1 and n ≤ 15; k = m-15

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

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

Bits

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

3GPP Type: 18

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

SGSN address value: text

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

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

Bits

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

3GPP Type: 19

Length: 3

If the value of TI is set to "1", then all PDP contexts that share the same user session with the PDP context identified by the NSAPI included in the Delete PDP Context Request Message shall be torn down. Only the PDP context identified by the NSAPI included in the Delete PDP context Request shall be torn down if the value of TI is "0".

20 -3GGP- **IMEISV**

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP Type = 20							
2	3GPP Length = 18							
3	IMEISV digits 1 - n							

3GPP Type: 20

n = 16 where TAC = 8 digits SNR = 6 digits & SVN = 2 digits

21 - 3GPP-***Packet-Filter***

Octets	Bits 8	7	6	5	4	3	2	1
1	3GPP type = 21							
2	3GPP Length= n							
3-z	Packet Filter							

3GPP Type: 21

Length: n

Each 3GPP-Packet-Filter attribute contains only one packet filter. Multiple 3GPP-Packet-Filter attributes can be sent in one RADIUS Accounting Request message.

When the GGSN sends the packet filter information, the RADIUS message shall carry ALL (or none) of the packet filters.

Packet Filter Value:

8	7	6	5	4	3	2	1	
Packet filter identifier								Octet 1
Packet filter evaluation precedence								Octet 2
Length of Packet filter contents								Octet 3
Direction of Packet Filter								Octet 4
Packet filter contents								Octet 5
								Octet m

Direction Value:

00000000: Downlink

00000001: Uplink

The packet filter content is defined below:

Type	Value
1: IPv4 address type	Contains the source address if the direction value is set to Downlink, and the destination address if the direction value is set to Uplink. shall be encoded as a sequence of a four octet *IPv4 address* field and a four octet *IPv4 address mask* field. The *IPv4 address* field shall be transmitted first
2: IPv6 address type	Contains the source address if the direction value is set to Downlink, and the destination address if the direction value is set to Uplink. shall be encoded as a sequence of a sixteen octet *IPv6 address* field and a sixteen octet *IPv6 address mask* field. The *IPv6 address* field shall be transmitted first
3: Protocol identifier/Next header type	shall be encoded as one octet which specifies the IPv4 protocol identifier or IPv6 next header
4: Single destination port type	shall be encoded as two octet which specifies a port number
5 : Destination port range type	shall be encoded as a sequence of a two octet *port*

	range low limit field and a two octet *port range high limit* field. The *port range low limit* field shall be transmitted first
6 : Single source port type	shall be encoded as two octet which specifies a port number
7: Source port range type	shall be encoded as a sequence of a two octet *port range low limit* field and a two octet *port range high limit* field. The *port range low limit* field shall be transmitted first
8: Security parameter index type (IPv6)	shall be encoded as four octet which specifies the IPSec security parameter index
9: Type of service/Traffic class type	shall be encoded as a sequence of a one octet *Type-of-Service/Traffic Class* field and a one octet *Type-of-Service/Traffic Class mask* field. The *Type-of-Service/Traffic Class* field shall be transmitted first
10: Flow label type (IPv6)	shall be encoded as three octets which specify the IPv6 flow label. The bits 8 through 5 of the first octet shall be spare whereas the remaining 20 bits shall contain the IPv6 flow label

Note: The sending of this attribute is not recommended for an inter-operator interface for security reason

End of Change in Clause 16.4.7

3GPP TSG-CN WG3 Meeting #34 **Tdoc N3-040846**

Seoul, Korea. 15th to 19th November 2004.

CR-Form-v7

CHANGE REQUEST

⌘ **29.061** **CR** 139 ⌘ **rev** **1** ⌘ Current version: **6.2.0** ⌘

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

Title:	⌘	RADIUS Enhancements on the Gi interface to enable QoS correlation (Packet Filters)
Source:	⌘	Cisco Systems, Siemens, Vodafone, Orange
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Date:	⌘	15/11/2004
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Consequences if not approved:	⌘	QoS correlation may not be consistent.

Clauses affected:	⌘	16.4.7

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

Other comments: ⌘

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

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

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

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

Change in Clause 16.4.7

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

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

Table 7: List of the 3GPP Vendor-Specific sub-attributes

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

Sub-attr #	Sub-attribute Name	Description	Presence Requirement	Associated attribute (Location of Sub-attr)
				Interim-Update
6	3GPP-SGSN-Address	SGSN IP address that is used by the GTP control plane for the handling of control messages. It may be used to identify the PLMN to which the user is attached.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
7	3GPP-GGSN-Address	GGSN IP address that is used by the GTP control plane for the context establishment. It is the same as the GGSN IP address used in the GCDRs.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
8	3GPP-IMSI-MCC-MNC	MCC and MNC extracted from the user's IMSI (first 5 or 6 digits, as applicable from the presented IMSI).	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
9	3GPP-GGSN- MCC-MNC	MCC-MNC of the network the GGSN belongs to.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
10	3GPP-NSAPI	Identifies a particular PDP context for the associated PDN and MSISDN/IMSI from creation to deletion.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP Accounting-Request Interim-Update
11	3GPP- Session-Stop-Indicator	Indicates to the AAA server that the last PDP context of a session is released and that the PDP session has been terminated.	Optional	Accounting Request STOP
12	3GPP- Selection-Mode	Contains the Selection mode for this PDP Context received in the Create PDP Context Request Message	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
13	3GPP-Charging-Characteristics	Contains the charging characteristics for this PDP Context received in the Create PDP Context Request Message (only available in R99 and later releases)	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update

Sub-attr #	Sub-attribute Name	Description	Presence Requirement	Associated attribute (Location of Sub-attr)
14	3GPP-CG-IPv6-Address	Charging Gateway IPv6 address	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
15	3GPP-SGSN-IPv6-Address	SGSN IPv6 address that is used by the GTP control plane for the handling of control messages. It may be used to identify the PLMN to which the user is attached.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
16	3GPP-GGSN-IPv6-Address	GGSN IPv6 address that is used by the GTP control plane for the context establishment.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
17	3GPP- IPv6-DNS-Servers	List of IPv6 addresses of DNS servers for an APN	Optional	Access-Accept
18	3GPP-SGSN-MCC-MNC	MCC and MNC extracted from the RAI within the Create PDP Context Request or Update PDP Context Request message.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
19	3GPP-Teardown-Indicator	Indicate to the GGSN that all PDP contexts for this particular user and sharing the same user session need to be deleted.	Optional	Disconnect Request
20	3GPP-IMEISV	International Mobile Equipment Id and its Software Version	Optional	Accounting-Request START, Access-Request
21	3GPP-Packet-Filter	Packet Filter used for this PDP context	Optional	Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update

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

Bits

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

n ≥ 7

3GPP Vendor Id = 10415

The string part is encoded as follows:

Bits

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

m ≥ 2 and m ≤ 248

The 3GPP specific attributes encoding is clarified below.

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

Bits

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

3GPP Type: 1

n ≤15

Length: m ≤ 17

IMSI value: Text:

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

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

Bits

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

3GPP Type: 2

Length: 6

Charging ID value: 32 bits unsigned integer

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

Bits

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

3GPP Type: 3

Length: 6

PDP type value: Unsigned 32 bits integer

PDP type octet possible values:

0 = IPv4

1 = PPP

2 = IPv6

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

Bits

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

3GPP Type: 4

Length: 6

Charging GW address value: Address

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

Bits

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

3GPP Type: 5

Length: L ≤ 33 (release 5) or L ≤ 27 (release 99) or L = 11 (release 98)

QoS profile value: Text

UTF-8 encoded QoS profile syntax:

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

<Release indicator> = UTF-8 encoded number :

"98" = Release 98

"99"= Release 99

"05"= Release 5

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

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

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

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

The release 5 QoS profile data is 14 octets long, which results in a 28 octets UTF-8 encoded string.

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

Bits

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

3GPP Type: 6

Length: 6

SGSN address value: Address

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

Bits

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

3GPP Type: 7

Length: 6

GGSN address value: Address

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

Bits

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

3GPP Type: 8

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

MS address value: text

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

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

Bits

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

3GPP Type: 9

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

GGSN address value: text

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

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

Bits

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

3GPP Type: 10

Length: 3

NSAPI value: text

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

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

Bits

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

3GPP Type: 11

Length: 3

Value is set to all 1.

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

Bits

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

3GPP Type: 12

Length: 3

Selection mode value: Text

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

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

Bits

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

3GPP Type: 13

Length: 6

Charging characteristics value: Text

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

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

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

Bits

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

3GPP Type: 14

Length: 18

Charging GW IPv6 address value: IPv6 Address

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

Bits

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

3GPP Type: 15

Length: 18

SGSN IPv6 address value: IPv6 Address

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

Bits

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

3GPP Type: 16

Length: 18

GGSN IPv6 address value: IPv6 Address

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

Bits

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

3GPP Type: 17

Length: m = n × 16 + 2; n ≥ 1 and n ≤ 15; k = m-15

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

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

Bits

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

3GPP Type: 18

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

SGSN address value: text

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

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

Bits

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

3GPP Type: 19

Length: 3

If the value of TI is set to "1", then all PDP contexts that share the same user session with the PDP context identified by the NSAPI included in the Delete PDP Context Request Message shall be torn down. Only the PDP context identified by the NSAPI included in the Delete PDP context Request shall be torn down if the value of TI is "0".

20 -3GGP**- IMEISV**

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP Type = 20							
2	3GPP Length = 18							
3	IMEISV digits 1 - n							

3GPP Type: 20

n = 16 where TAC = 8 digits SNR = 6 digits & SVN = 2 digits

21 - 3GPP-***Packet-Filter***

Octets	Bits 8	7	6	5	4	3	2	1
1	3GPP type = 21							
2	3GPP Length= n							
3-z	Packet Filter							

3GPP Type: 21

Length: n

Each 3GPP-Packet-Filter attribute contains only one packet filter. Multiple 3GPP-Packet-Filter attributes can be sent in one RADIUS Accounting Request ~~-~~message.

When the GGSN sends the packet filter information, the RADIUS message shall carry ALL (or none) of the packet filters.

Packet Filter Value:

8	7	6	5	4	3	2	1	
Packet filter identifier								Octet 1
Packet filter evaluation precedence								Octet 2
Length of Packet filter contents								Octet 3
Direction of Packet Filter								Octet 4
Packet filter contents								Octet 5
								Octet m

Direction Value:

00000000: Downlink

00000001: Uplink

The packet filter content is defined below:

Type	Value
1: IPv4 address type	Contains the source address ~~in case~~ if the direction value is set to Downlink, and the destination address ~~in case~~ if the direction value is set to Uplink. shall be encoded as a sequence of a four octet *IPv4 address* field and a four octet *IPv4 address mask* field. The *IPv4 address* field shall be transmitted first
2: IPv6 address type	Contains the source address ~~in case~~ if the direction value is set to Downlink, and the destination address ~~in case~~if the direction value is set to Uplink. shall be encoded as a sequence of a sixteen octet *IPv6 address* field and a sixteen octet *IPv6 address mask* field. The *IPv6 address* field shall be transmitted first
3: Protocol identifier/Next header type	shall be encoded as one octet which specifies the IPv4 protocol identifier or IPv6 next header
4: Single destination port type	shall be encoded as two octet which specifies a port number
5 : Destination port range type	shall be encoded as a sequence of a two octet *port*

	range low limit field and a two octet *port range high limit* field. The *port range low limit* field shall be transmitted first
6 : Single source port type	shall be encoded as two octet which specifies a port number
7: Source port range type	shall be encoded as a sequence of a two octet *port range low limit* field and a two octet *port range high limit* field. The *port range low limit* field shall be transmitted first
8: Security parameter index type (IPv6)	shall be encoded as four octet which specifies the IPSec security parameter index
9: Type of service/Traffic class type	shall be encoded as a sequence of a one octet *Type-of-Service/Traffic Class* field and a one octet *Type-of-Service/Traffic Class mask* field. The *Type-of-Service/Traffic Class* field shall be transmitted first
10: Flow label type (IPv6)	shall be encoded as three octets which specify the IPv6 flow label. The bits 8 through 5 of the first octet shall be spare whereas the remaining 20 bits shall contain the IPv6 flow label

Note: The sending of this attribute is not recommended for an inter-operator interface for security reason

End of Change in Clause 16.4.7

3GPP TSG-CN WG3 Meeting #34 **Tdoc N3-040847**

Seoul, Korea. 15th to 19th November 2004.

CR-Form-v7.1

CHANGE REQUEST

⌘ **29.061** **CR** **138** ⌘ **rev** **1** ⌘ Current version: **6.2.0** ⌘

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

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

Title:	⌘	RADIUS Enhancements on the Gi interface for QoS information (Negotiated DSCP)
Source:	⌘	Cisco Systems, Siemens, Vodafone, Orange
Work item code:	⌘	TEI_6
Date:	⌘	15/11/2004
Category:	⌘	**B**
Release:	⌘	Rel-6

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:

Ph2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*
Rel-7	*(Release 7)*

Reason for change:	⌘	Operators use RADIUS interface to send information related to a GPRS session throughout the network. The information can be used for authentication, authorization or billing purpose. Since the GGSN may map the GPRS/UMTS QoS to a DSCP and mark the user IP packets using this DSCP, this CR proposes to send the DSCP marking used into a RADIUS VSA.
Summary of change:	⌘	To export the required information, the following new 3GPP Vendor Specific Attributes is defined: *3GPP-Negotiated-DSCP*: the GGSN will mark the user packet with a DSCP corresponding to an internal mapping (e.g. UMTS classes to DSCP mapping). This attribute contains the DSCP used by the GGSN to mark this PDP context. This attribute can optionally be sent in the Access Request, Accounting Request START, Interim-Update, and STOP messages.
Consequences if not approved:	⌘	QoS correlation may be inconsistent.

Clauses affected:	⌘	16.4.7

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

Other comments: ⌘	

How to create CRs using this form:

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

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

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

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

Change in Clause 16.4.7

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

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

Table 7: List of the 3GPP Vendor-Specific sub-attributes

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

Sub-attr #	Sub-attribute Name	Description	Presence Requirement	Associated attribute (Location of Sub-attr)
		extracted from the user's IMSI (first 5 or 6 digits, as applicable from the presented IMSI).		Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
9	3GPP-GGSN- MCC-MNC	MCC-MNC of the network the GGSN belongs to.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
10	3GPP-NSAPI	Identifies a particular PDP context for the associated PDN and MSISDN/IMSI from creation to deletion.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP Accounting-Request Interim-Update
11	3GPP- Session-Stop-Indicator	Indicates to the AAA server that the last PDP context of a session is released and that the PDP session has been terminated.	Optional	Accounting Request STOP
12	3GPP- Selection-Mode	Contains the Selection mode for this PDP Context received in the Create PDP Context Request Message	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
13	3GPP-Charging-Characteristics	Contains the charging characteristics for this PDP Context received in the Create PDP Context Request Message (only available in R99 and later releases)	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
14	3GPP-CG-IPv6-Address	Charging Gateway IPv6 address	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
15	3GPP-SGSN-IPv6-Address	SGSN IPv6 address that is used by the GTP control plane for the handling of control messages. It may be used to identify the PLMN to which the user is attached.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
16	3GPP-GGSN-IPv6-Address	GGSN IPv6 address that is used by the GTP control plane for	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP,

Sub-attr #	Sub-attribute Name	Description	Presence Requirement	Associated attribute (Location of Sub-attr)
		the context establishment.		Accounting-Request Interim-Update
17	3GPP- IPv6-DNS-Servers	List of IPv6 addresses of DNS servers for an APN	Optional	Access-Accept
18	3GPP-SGSN-MCC-MNC	MCC and MNC extracted from the RAI within the Create PDP Context Request or Update PDP Context Request message.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
19	3GPP-Teardown-Indicator	Indicate to the GGSN that all PDP contexts for this particular user and sharing the same user session need to be deleted.	Optional	Disconnect Request
20	3GPP-IMEISV	International Mobile Equipment Id and its Software Version	Optional	Accounting-Request START, Access-Request
22	3GPP-Negotiated-DSCP	DSCP used to mark the IP packets of this PDP context on the Gi interface	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update

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

Bits

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

$n \geq 7$

3GPP Vendor Id = 10415

The string part is encoded as follows:

Bits

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

$m \geq 2$ and $m \leq 248$

The 3GPP specific attributes encoding is clarified below.

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

Bits

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

3GPP Type: 1

n ≤15

Length: m ≤ 17

IMSI value: Text:

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

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

Bits

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

3GPP Type: 2

Length: 6

Charging ID value: 32 bits unsigned integer

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

Bits

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

3GPP Type: 3

Length: 6

PDP type value: Unsigned 32 bits integer

PDP type octet possible values:

0 = IPv4

1 = PPP

2 = IPv6

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

Bits

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

3GPP Type: 4

Length: 6

Charging GW address value: Address

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

Bits

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

3GPP Type: 5

Length: L ≤ 33 (release 5) or L ≤ 27 (release 99) or L = 11 (release 98)

QoS profile value: Text

UTF-8 encoded QoS profile syntax:

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

<Release indicator> = UTF-8 encoded number :

"98" = Release 98

"99"= Release 99

"05"= Release 5

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

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

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

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

The release 5 QoS profile data is 14 octets long, which results in a 28 octets UTF-8 encoded string.

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

Bits

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

3GPP Type: 6

Length: 6

SGSN address value: Address

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

Bits

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

3GPP Type: 7

Length: 6

GGSN address value: Address

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

Bits

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

3GPP Type: 8

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

MS address value: text

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

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

Bits

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

3GPP Type: 9

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

GGSN address value: text

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

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

Bits

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

3GPP Type: 10

Length: 3

NSAPI value: text

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

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

Bits

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

3GPP Type: 11

Length: 3

Value is set to all 1.

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

Bits

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

3GPP Type: 12

Length: 3

Selection mode value: Text

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

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

Bits

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

3GPP Type: 13

Length: 6

Charging characteristics value: Text

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

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

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

Bits

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

3GPP Type: 14

Length: 18

Charging GW IPv6 address value: IPv6 Address

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

Bits

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

3GPP Type: 15

Length: 18

SGSN IPv6 address value: IPv6 Address

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

Bits

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

3GPP Type: 16

Length: 18

GGSN IPv6 address value: IPv6 Address

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

Bits

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

3GPP Type: 17

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

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

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

Bits

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

3GPP Type: 18

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

SGSN address value: text

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

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

Bits

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

3GPP Type: 19

Length: 3

If the value of TI is set to "1", then all PDP contexts that share the same user session with the PDP context identified by the NSAPI included in the Delete PDP Context Request Message shall be torn down. Only the PDP context identified by the NSAPI included in the Delete PDP context Request shall be torn down if the value of TI is "0".

20 -3GGP**- IMEISV**

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP Type = 20							
2	3GPP Length = 18							
3	IMEISV digits 1 - n							

3GPP Type: 20

n = 16 where TAC = 8 digits SNR = 6 digits & SVN = 2 digits

22 - 3GPP-***Negotiated-DSCP***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 22							
2	3GPP Length= 3							
3	Negotiated DSCP							

3GPP Type: 22

Length: 3

Negotiated DSCP value: String

The DSCP value is converted into an octet string.

End of Change in Clause 16.4.7