NOKIA

7750 SERVICE ROUTER
VIRTUALIZED SERVICE ROUTER

GY AVPS REFERENCE GUIDE
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Nokia is committed to diversity and inclusion. We are continuously reviewing our customer documentation and consulting with standards bodies to ensure that terminology is inclusive and aligned with the industry. Our future customer documentation will be updated accordingly.

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1 Getting started

1.1 About this guide

This document details the Diameter Gy interface specification. The Diameter Gy application is also referred to as Diameter Credit Control Application (DCCA).

The tables in this document provide Attribute Value Pair (AVP) details organized per message type.

The SR OS also provides a Diameter Python interface that enables flexible insertion, deletion, and formatting of AVPs received from and sent to a Diameter application server. For more information about the Diameter Python API, see the *7450 ESS, 7750 SR, and VSR Triple Play Service Delivery Architecture Guide*.

1.1.1 Audience

This document is intended for network administrators who are responsible for configuring and operating 7750 SR and VSR service routers and using Diameter applications. It is assumed that the network administrators have an understanding of networking principles and configurations, routing processes, protocols, and standards.

1.1.2 References

RFC 2865, "Remote Authentication Dial In User Service (RADIUS)", June 2000

RFC 4006, "Diameter Credit-Control Application", August 2005

RFC 6733, "Diameter Base Protocol", October 2012

3GPP TS 32.299 v9.4.0, "Diameter charging applications", June 2010

7450 ESS, 7750 SR, and VSR RADIUS Attributes Reference Guide

2 Diameter Gy interface specification

Table 1: Diameter Gy application messages provides a summary of the Diameter Gy application messages.

Table 1: Diameter Gy application messages

Diameter message		Code	RFC
CCR	Credit-Control-Request	272	RFC 4006
CCA	Credit-Control-Answer	272	RFC 4006
RAR	Re-Auth-Request	258	RFC 6733
RAA	Re-Auth-Answer	258	RFC 6733
ASR	Abort-Session-Request	274	RFC 6733
ASA	Abort-Session-Answer	274	RFC 6733

2.1 Diameter Gy – Credit-Control-Request (CCR) command

This section describes the Diameter Gy CCR message format as defined in RFC 4006, *Diameter Credit-Control Application*. ~~Strikethrough~~ formatted AVPs are not included in CCR. AVPs listed in *italics* appearing after [AVP] and are not defined in RFC 4006.

```
 <Credit-Control-Request> ::= < Diameter Header: 272, REQ, PXY >
                                  < Session-Id >
                                  { Origin-Host }
                                  { Origin-Realm }
                                  { Destination-Realm }
                                  { Auth-Application-Id }
                                  { Service-Context-Id }
                                  { CC-Request-Type }
                                  { CC-Request-Number }
                                  [ Destination-Host ]
                                  [ User-Name ]
                                  ~~[ CC-Sub-Session-Id ]~~
~~[ Acct-Multi-Session-Id ]~~
                                  [ Origin-State-Id ]
                                  [ Event-Timestamp ]
                                 *[ Subscription-Id ]
                                  ~~[ Service-Identifier ]~~
                                  [ Termination-Cause ]
                                  ~~[ Requested-Service-Unit ]~~
~~[ Requested-Action ]~~
~~*[ Used-Service-Unit ]~~
                                  [ Multiple-Services-Indicator ]
                                 *[ Multiple-Services-Credit-Control ]
                                 ~~*[ Service-Parameter-Info ]~~
~~[ CC-Correlation-Id ]~~
```

```
                                    [ User-Equipment-Info ]
                                   *[ Proxy-Info ]
*[ Route-Record ]
                                   *[ AVP ]
                                    [ Framed-IP-Address ]
                                    [ Called-Station-Id ]
                                    [ Framed-IPv6-Prefix ]
                                    [ Delegated-IPv6-Prefix ]
                                    [ Alc-IPv6-Address ]
                                    [ 3GPP-IMSI ]
                                    [ 3GPP-Charging-Id ]
                                    [ 3GPP-GPRS-QoS-Negotiated-Profile ]
                                    [ 3GPP-GGSN-Address ]
                                    [ 3GPP-NSAPI ]
                                    [ 3GPP-Session-Stop-Indicator ]
                                    [ 3GPP-Selection-Mode ]
                                    [ 3GPP-Charging-Characteristics ]
                                    [ 3GPP-GGSN-v6-Address ]
                                    [ 3GPP-RAT-Type ]
                                    [ 3GPP-User-Location-Info ]
                                    [ GGSN-Address ]
                                    [ Service-Information ]
                                    [ Charging-Rule-Base-Name ]
                                    [ PDP-Context-Type ]
```

2.1.1 Diameter Gy – CCR message top level AVPs

Table 2: Diameter Gy CCR: top level AVP description provides a detailed description of each top-level AVP present in a Diameter Gy CCR message. Unless mentioned in the description, the AVP is present in Initial, Update, and Terminate messages. Grouped AVPs are marked with "↳ (grouped AVP)". The grouped AVP format and embedded AVP description and format are described in Diameter Gy – CCR message grouped AVPs .

Table 2: Diameter Gy CCR: top level AVP description

AVP code	AVP name	Description
1	User-Name	RADIUS username AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp radius-user-name** default: not included
8	Framed-IP-Address	The IP address of the IPv4 subscriber host that triggered the creation of the Diameter Gy session. AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp** *address-avp* Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured **(gy include-avp ps-information)**. default: included

AVP code	AVP name	Description
30	Called-Station-Id	AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp called-station-id** *string* Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured (**gy include-avp ps-information**). value: string of maximum 64 characters default: no called-station-id
55	Event-Timestamp	Timestamp when the request was generated.
97	Framed-IPv6-Prefix	The IPv6 prefix of the SLAAC subscriber host that triggered the creation of the Diameter Gy session. AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp address-avp** Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured (**gy include-avp ps-information**). default: included
123	Delegated-IPv6-Prefix	The IPv6 prefix of the DHCPv6 IA-PD subscriber host that triggered the creation of the Diameter Gy session. AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp address-avp** Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured (**gy include-avp ps-information**). default: included
258	Auth-Application-Id	Fixed value: 4 = Diameter Credit Control Application
263	Session-Id	A session is a logical concept at the application layer that exists between the Diameter client and the Diameter server; it is identified via the Session-Id AVP. Format: <DiameterIdentity>; <high 32 bits>; <low 32 bits> • <DiameterIdentity> is the configured origin host • <high 32 bits> are encoded as the Diameter initialization time (number of seconds because 1 January, 1970) • <low 32 bits> are encoded as a sequentially increasing number starting at 1

AVP code	AVP name	Description
		Example: bng.nokia.com;1326398325;1
264	Origin-Host	Diameter Identity. As configured in the corresponding diameter-peer-policy. Example: bng.nokia.com
278	Origin-State-Id	Initialized to the Diameter process startup time. Encoded as number of seconds since 1 January, 1970.
283	Destination-Realm	Diameter Identity. As configured in the corresponding diameter-peer-policy or learned from CCA/RAR. Example: nokia.com
293	Destination-Host	Diameter Identity. As configured in the corresponding diameter-peer-policy or learned from CCA/RAR. Omitted in CCR-I if not configured. Example: server.nokia.com
295	Termination-Cause	(CCR-T only) Indicates the reason that the credit control session was terminated. Values: 1 = Diameter Logout 4 = Diameter Administrative - a diameter session could not be created because of category mismatch or system resources
296	Origin-Realm	Diameter Identity. As configured in the corresponding diameter-peer-policy. Example: nokia.com
415	CC-Request-Number	Initial Request: 0 Update and Termination Request: sequence number
416	CC-Request-Type	1 = Initial Request 2 = Update Request 3 = Termination Request
443	Subscription-Id ↳ (grouped AVP)	Identifies the subscriber host or session. Value as configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy avp-subscription-id {circuit-id | subscriber-id | imsi | msisdn | imei} [type {e164 | imsi | nai | private}]** If no data is available for the specified origin, then the subscriber-id is used instead.

AVP code	AVP name	Description
		default: avp-subscription-id subscriber-id type private For GTP access, the configured value is ignored and two Subscription-Id AVPs are included: IMSI (type imsi) and MSISDN (type e164) with the corresponding values learned from the GTP Create Session Request message.
455	Multiple-Services-Indicator	(CCR-I only) Fixed value: 1 = MULTIPLE_SERVICES_SUPPORTED
456	Multiple-Services-Credit-Control ↳ (grouped AVP)	Up to sixteen Multiple-Services-Credit-Control AVPs, each corresponding with a single rating group. A rating group maps to a category configured in a category-map: **configure subscriber-mgmt category-map** *category-map-name* **category** *category-name* **rating-group** *rating-group-id*
458	User-Equipment-Info ↳ (grouped AVP)	(GTP access only) AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp user-equipment-info type imeisv** value: IMEI as signaled in the GTP Create Session Request message. default: not included
461	Service-Context-Id	AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy application-policy-name gy include-avp service-context-id** *string* value: string of up to 32 characters default: no service-context-id
NOKIA – 99	Alc-IPv6-Address	The IPv6 address of the DHCPv6 IA-NA subscriber host that triggered the creation of the Diameter Gy session. AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp address-avp** Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured (**gy include-avp ps-information**). default: included
3GPP – 1	3GPP-IMSI	AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp 3gpp-imsi {circuit-id | imsi | subscriber-id}**

AVP code	AVP name	Description
		Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured (**gy include-avp ps-information**). values: • circuit-id • imsi • subscriber-id default: included with value subscriber-id
3GPP – 2	3GPP-Charging-Id	AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp 3gpp-charging-id {auto | esm-info | id}** Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured (**gy include-avp ps-information**). values: • auto: defaults to esm-info for **vendor-support three-gpp** • esm-info: <subscriber-id>;<sap-id>;<sla-profile>[<SPI sharing id>] • id: a unique 32 bit integer value per session default: included with esm-info value (auto)
3GPP – 5	3GPP-GPRS-QoS-Negotiated-Profile	AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp 3gpp-gprs-negotiated-qos-profile** Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured (**gy include-avp ps-information**). value: the active SLA profile name default: included
3GPP – 7	3GPP-GGSN-Address	The local IPv4 address used to setup the diameter peer. AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp 3gpp-ggsn-address** Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured (**gy include-avp ps-information**). value: **1.** Use the configured IPv4 source address:

AVP code	AVP name	Description
		configure aaa diameter-peer-policy *peer-policy-name* **source-address** *ip-address* **2.** If router = base or vprn service id: use the system interface IPv4 address else if router = management: use the active management port IP address configured in the BOF default: included
3GPP – 10	3GPP-NSAPI	AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp 3gpp-nsapi** Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured (**gy include-avp ps-information**). value: <system name>;<service-id>;<sap-id> default: included
3GPP – 11	3GPP-Session-Stop-Indicator	(CCR-T only) AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp 3gpp-session-stop-indicator** Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured (**gy include-avp ps-information**). Fixed value: 0x FF default: included
3GPP – 12	3GPP-Selection-Mode	AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp 3gpp-selection-mode** Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured (**gy include-avp ps-information**). Fixed value: 0x 00 00 00 00 (MS or network provided APN, subscribed verified) default: included
3GPP – 13	3GPP-Charging-Characteristics	AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp 3gpp-charging-characteristics**

AVP code	AVP name	Description
		Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured (**gy include-avp ps-information**). Fixed value: "0000" default: included
3GPP – 16	3GPP-GGSN-v6-Address	The local IPv6 address used to setup the diameter peer. AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp 3gpp-ggsn-ipv6-address** Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured **(gy include-avp ps-information**). value: **1.** Use the configured IPv6 source address: **configure aaa diameter-peer-policy** *peer-policy-name* **ipv6-source-address** *ipv6-address* **2.** If router = base or vprn service id: use the system interface IPv6 address else if router = management: use the active management port IP address configured in the BOF default: not included
3GPP – 21	3GPP-RAT-Type	AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp 3gpp-rat-type <value>** Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured (**gy include-avp ps-information**). value: [1 to 255] default: not included For GTP access, the RAT-Type value is learned from the GTP Create Session Request message. The configured value is used when the GTP learned value is unknown or invalid.
3GPP - 22	3GPP-User-Location-Info	(GTP access only) Provides UE location details AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp 3gpp-user-location-info**

AVP code	AVP name	Description
		value: ULI learned from the GTP Create Session Request message. default: not included
3GPP – 847	GGSN-Address	The local address used to setup the diameter peer. AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp ggsn-address {ipv4 | ipv6}** Either IPv4 or IPv6 address can be included. Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured (**gy include-avp ps-information**). value: **1.** Use the configured IP source address: **configure aaa diameter-peer-policy** *peer-policy-name* **ipv6-source-address** *ipv6-address* | **source-address** *ip-address* **2.** If router = base or vprn service id: use the system interface IP address else if router = management: use the active management port IP address configured in the BOF default: not included
3GPP – 873	Service-Information ↳ (grouped AVP)	Grouped AVP containing the [3GPP – 874] PS-Information grouped AVP and embedding following AVPs: • [8] Framed-IP-Address • [30] Called-Station-Id • [97] Framed-IPv6-Prefix • [123] Delegated-IPv6-Prefix • [NOKIA – 99] Alc-IPv6-Address • [3GPP – 1] 3GPP-IMSI • [3GPP – 2] 3GPP-Charging-Id • [3GPP – 5] 3GPP-GPRS-Negotiated-QoS-profile • [3GPP – 7] 3GPP-GGSN-Address • [3GPP – 10] GGSN-NSAPI • [3GPP – 11] 3GPP-Session-Stop-Indicator • [3GPP – 12] 3GPP-Selection-Mode • [3GPP – 13] 3GPP-Charging-Characteristics • [3GPP – 16] 3GPP-GGSN-IPv6-Address

AVP code	AVP name	Description
		• [3GPP – 21] 3GPP-RAT-Type • [3GPP – 847] GGSN-Address • [3GPP – 1004] Charging-Rule-Base-Name • [3GPP – 1247] PDP-Context-Type AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp ps-information** When not configured the above listed AVPs are included at command level. default: no ps-information
3GPP – 1004	Charging-Rule-Base-Name	AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp charging-rule-base-name {category-map-name** | *string*} Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured (**gy include-avp ps-information**). value: • category-map-name: the name of the category-map in use for this session • string: a string of max. 64 characters. default: charging-rule-base-name category-map-name
3GPP – 1247	PDP-Context-Type	(CCR-I only) AVP included if configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy include-avp pdp-context-type** Included at command level or embedded within [3GPP – 873] Service-Information / [3GPP – 874] PS-Information grouped AVPs when configured (**gy include-avp ps-information**). Fixed value: 0 (primary) default: included

Table 3: Diameter Gy CCR: top level AVP format

AVP code	AVP name	Standard	Data format	Flags
1	User-Name	RFC 2865/RFC 6733	UTF8 String	M
8	Framed-IP-Address	RFC 2865	Octet String	M

AVP code	AVP name	Standard	Data format	Flags
30	Called-Station-Id	RFC 2865	UTF8 String	M
55	Event-Timestamp	RFC 6733/RFC 4006	Time	M
97	Framed-IPv6-Prefix	RFC 3162	Octet String	M
123	Delegated-IPv6-Prefix	RFC 4818	Octet String	M
258	Auth-Application-Id	RFC 6733/RFC 4006	Unsigned 32	M
263	Session-Id	RFC 6733	UTF8 String	M
264	Origin-Host	RFC 6733	Diameter Identity	M
278	Origin-State-Id	RFC 6733	Unsigned 32	M
283	Destination-Realm	RFC 6733	Diameter Identity	M
293	Destination-Host	RFC 6733	Diameter Identity	M
295	Termination-Cause	RFC 6733	Enumerated	M
296	Origin-Realm	RFC 6733	Diameter Identity	M
415	CC-Request-Number	RFC 4006	Unsigned 32	M
416	CC-Request-Type	RFC 4006	Enumerated	M
443	Subscription-Id ↳ (grouped AVP)	RFC 4006	Grouped	M
455	Multiple-Services-Indicator	RFC 4006	Enumerated	M
456	Multiple-Services-Credit-Control ↳ (grouped AVP)	RFC 4006	Grouped	M
458	User-Equipment-Info ↳ (grouped AVP)	RFC 4006	Grouped	M
461	Service-Context-Id	RFC 4006	UTF8 String	M
NOKIA – 99	Alc-IPv6-Address	-	Octet String	V
3GPP – 1	3GPP-IMSI	TS 29.061/ TS 32.299	UTF8 String	V
3GPP – 2	3GPP-Charging-Id	TS 29.061/ TS 32.299	UTF8 String	V
3GPP – 5	3GPP-GPRS-QoS-Negotiated-Profile	TS 29.061	UTF8 String	V
3GPP – 7	3GPP-GGSN-Address	TS 29.061	Octet String	V
3GPP – 10	3GPP-NSAPI	TS 29.061	UTF8 String	V

AVP code	AVP name	Standard	Data format	Flags
3GPP – 11	3GPP-Session-Stop-Indicator	TS 29.061	UTF8 String	V
3GPP – 12	3GPP-Selection-Mode	TS 29.061	UTF8 String	V
3GPP – 13	3GPP-Charging-Characteristics	TS 29.061	UTF8 String	V
3GPP – 16	3GPP-GGSN-v6-Address	TS 29.061	Octet String	V
3GPP – 21	3GPP-RAT-Type	TS 29.061	Octet String	V
3GPP – 22	3GPP-User-Location-Info	TS 29.061	Octet String	V
3GPP – 847	GGSN-Address	TS 32.299	Address	V
3GPP – 873	Service-Information ↳ (grouped AVP)	TS 32.299	Grouped	V
3GPP – 1004	Charging-Rule-Base-Name	TS 29.212	Octet String	V, M
3GPP – 1247	PDP-Context-Type	TS 32.299	Enumerated	V, M

2.1.2 Diameter Gy – CCR message grouped AVPs

This section provides an overview of CCR message grouped AVPs.

2.1.2.1 Diameter Gy CCR – Subscription-Id grouped AVP

Grouped AVP format as defined in RFC 4006:

```
Subscription-Id ::= < AVP Header: 443 >
                        { Subscription-Id-Type }
                        { Subscription-Id-Data }
```

Table 4: Diameter Gy CCR: Subscription-Id grouped AVP description

AVP code	AVP name	Description
450	Subscription-Id-Type	Value as configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy avp-subscription-id {circuit-id | subscriber-id | imsi | msisdn | imei} [type {e164 | imsi | nai | private}]** values: • e164: identifier in international E.164 format (ITU-T E.164) • imsi: identifier in international IMSI format (ITU-T E.212) • nai: identifier in the form of a Network Access Identifier (RFC 2486)

AVP code	AVP name	Description
		• private: a credit control server private identifier default: type private For GTP access, the configured value is ignored and the type is set to imsi and msisdn respectively for each of the two included Subscription-Id AVPs.
444	Subscription-Id-Data	Value as configured in the diameter application policy: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy avp-subscription-id {circuit-id | subscriber-id | imsi | msisdn | imei} [type {e164 | imsi | nai | private}]** Note that there is no check if the provided data is in the format of the configured type. values: • circuit-id • subscriber-id • imsi • msisdn • imei default: avp-subscription-id subscriber-id For GTP access, the Subscription ID data is learned from GTP and contains the IMSI and MSISDN.

Table 5: Diameter Gy CCR: Subscription-Id grouped AVP format

AVP code	AVP name	Standard	Data format	Flags
450	Subscription-Id-Type	RFC 4006	Enumerated	M
444	Subscription-Id-Data	RFC 4006	UTF8 String	M

2.1.2.2 Diameter Gy CCR – Multiple-Services-Credit-Control grouped AVP

Grouped AVP format as defined in RFC 4006. ~~Strikethrough~~ formatted AVPs are not included in CCR. *Italic* formatted AVPs listed after [AVP] are not defined in RFC 4006.

```
Multiple-Services-Credit-Control ::= < AVP Header: 456 >
                                        ~~[ Granted-Service-Unit ]~~
                                         [ Requested-Service-Unit ]
                                       *[ Used-Service-Unit ]
                                        ~~[ Tariff-Change-Usage ]~~
                                       *~~[ Service-Identifier ]~~
                                         [ Rating-Group ]
                                       *~~[ G-S-U-Pool-Reference ]~~
~~[ Validity-Time ]~~
~~[ Result-Code ]~~
```

```
[ Final-Unit-Indication ]
                                        *[ AVP ]
                                         [ Reporting-Reason ]
```

Table 6: Diameter Gy CCR: Multiple-Services-Credit-Control Grouped AVP description

AVP code	AVP name	Description
432	Rating-Group	Rating group for which the quota is requested or reported. Corresponds with a category within a category-map defining the queues/policers and direction to monitor. **configure subscriber-mgmt category-map** *category-map-name* **category** *category-name* **rating-group** *rating-group-id*
437	Requested-Service-Unit ↳ (grouped AVP)	(CCR-I and CCR-U only) When included, the Requested-Service-Unit AVP has an empty data field in all CCR Initial/Update messages.
446	Used-Service-Unit ↳ (grouped AVP)	(CCR-U and CCR-T only) Amount of used service units measured for a specified category or rating group to a specified quota type. The Used-Service-Unit AVP is not present in CCR-U when all contained AVP values are zero and the Reporting-Reason = Validity Time (4) or Forced Reauthorization (7).
3GPP – 872	Reporting-Reason	Specifies the reason for which the Used-Service-Units are reported. CCR-U and CCR-T only. Values • 0 (Threshold): used quota reached time or volume threshold value (threshold value different from zero) • 1 (Quota Holding Time): expiration of the Quota Holding Time • 2 (Final): Diameter session termination; can be client or server initiated. • 3 (Quota Exhausted): no threshold or threshold is zero and quota exhausted. • 4 (Validity Time): expiration of the Validity Time • 5 (Other Quota Type): not supported • 6 (Rating Condition Change): not supported • 7 (Forced Reauthorisation): reception of a RAR message

AVP code	AVP name	Description
		• 8 (Pool Exhausted): not supported

Table 7: Diameter Gy CCR: Multiple-Services-Credit-Control grouped AVP format

AVP code	AVP name	Standard	Data format	Flags
432	Rating-Group	RFC 4006	Unsigned 32	M
437	Requested-Service-Unit ↳ (grouped AVP)	RFC 4006	Grouped	M
446	Used-Service-Unit ↳ (grouped AVP)	RFC 4006	Grouped	M
3GPP – 872	Reporting-Reason	TS 32.299	Enumerated	V, M

2.1.2.3 Diameter Gy CCR – Requested-Service-Unit grouped AVP

Grouped AVP format as defined in RFC 4006. ~~Strikethrough~~ formatted AVPs are not included in CCR.

```
Requested-Service-Unit ::= < AVP Header: 437 >
                            ~~[ CC-Time ]~~
~~[ CC-Money ]~~
~~[ CC-Total-Octets ]~~
~~[ CC-Input-Octets ]~~
~~[ CC-Output-Octets ]~~
~~[ CC-Service-Specific-Units ]~~
                           *~~[ AVP ]~~
```

The Requested-Service-Unit AVP has an empty data field in all CCR Initial/Update messages and is not present in a CCR Terminate message.

2.1.2.4 Diameter Gy CCR – Used-Service-Unit grouped AVP

Grouped AVP format as defined in RFC 4006. ~~Strikethough~~ formatted AVPs are not included in CCR.

```
Used-Service-Unit ::= < AVP Header: 446 >
                           ~~[ Tariff-Change-Usage ]~~
                           [ CC-Time ]
                           ~~[ CC-Money ]~~
                           [ CC-Total-Octets ]
                           [ CC-Input-Octets ]
                           [ CC-Output-Octets ]
                           ~~[ CC-Service-Specific-Units ]~~
                          *~~[ AVP ]~~
```

Table 8: Diameter Gy CCR: Used-Service-Unit grouped AVP description

AVP code	AVP name	Description
412	CC-Input-Octets	Number of ingress bytes forwarded via queues or policers that are monitored in ingress direction for this rating group. (**configure subscriber-mgmt category-map** *category-map-name* **category** *category-name* **queue | policer** *id* **ingress-only | ingress-egress**) Value equals zero when credit type is time or when no queues/policers are monitored in ingress direction.
414	CC-Output-Octets	Number of egress bytes forwarded via queues or policers that are monitored in egress direction for this rating group. (**configure subscriber-mgmt category-map** *category-map-name* **category** *category-name* **queue | policer** *id* **egress-only | ingress-egress**) Value equals zero when credit type is time. Or when no queues/policers are monitored in egress direction.
420	CC-Time	Total number of seconds during which activity is detected for queues or policers that are monitored for this rating group. (**configure subscriber-mgmt category-map** *category-map-name* **category** *category-name* **queue | policer ingress-only | egress-only | ingress-egress**). Only sampling periods exceeding the configured activity-threshold are counted (**configure subscriber-mgmt category-map** *category-map-name* **activity-threshold** *kilobits-per-second*) Value equals zero when credit type is volume.
421	CC-Total-Octets	Total number of bytes used for this rating-group. Corresponds with the sum of CC-Input-Octets and CC-Output-Octets. Value equals zero when credit type is time.

Table 9: Diameter Gy CCR: Used-Service-Unit grouped AVP format

AVP code	AVP name	Standard	Data format	Flags
412	CC-Input-Octets	RFC 4006	Unsigned 64	M
414	CC-Output-Octets	RFC 4006	Unsigned 64	M
420	CC-Time	RFC 4006	Unsigned 32	M
421	CC-Total-Octets	RFC 4006	Unsigned 64	M

2.1.2.5 DIAMETER Gy CCR - User-Equipment-Info grouped AVP

Grouped AVP format as defined in RFC 4006.

```
User-Equipment-Info ::= < AVP Header: 458 >
                        { User-Equipment-Info-Type }
                        { User-Equipment-Info-Value }
```

Table 10: Diameter Gy CCR: User-Equipment-Info grouped AVP description

AVP code	AVP name	Description
459	User-Equipment-Info-Type	(GTP access only) fixed value: IMEISV (0)
460	User-Equipment-Info-Value	(GTP access only) The Internet Mobile Equipment Identifier (IMEI) as signaled in the GTP Create Session Request message.

Table 11: Diameter Gy CCR: User-Equipment-Info grouped AVP format

AVP code	AVP name	Standard	Data format	Flags
459	User-Equipment-Info-Type	RFC 4006	Enumerated	
460	User-Equipment-Info-Value	RFC 4006	UTF8 String	

2.1.2.6 Diameter Gy CCR – Service-Information grouped AVP

Grouped AVP format as defined in TS 32.29. ~~Strikethrough~~ formatted AVPs are not included in CCR.

```
Service-Information :: = < AVP Header: 873>
                         * ~~[ Subscription-Id ]~~
~~[ AoC-Information ]~~
                           [ PS-Information ]
                           ~~[ WLAN-Information ]~~
~~[ IMS-Information ]~~
~~[ LCS-Information ]~~
~~[ PoC-Information ]~~
~~[ MBMS-Information ]~~
~~[ SMS-Information ]~~
~~[ MMTel-Information ]~~
~~[ Service-Generic-Information ]~~
~~[ IM-Information ]~~
~~[ DCD-Information ]~~
```

Table 12: Diameter Gy CCR: Service-Information grouped AVP description

AVP code	AVP name	Description
3GPP – 874	PS-Information ↳ (grouped AVP)	Allows the transmission of additional Packet Switched service-specific information elements.

Table 13: Diameter Gy CCR: Service-Information grouped AVP format

AVP code	AVP name	Standard	Data format	Flags
3GPP – 874	PS-Information ↳ (grouped AVP)	TS 32.299	Grouped	V

2.1.2.7 Diameter Gy CCR – PS-Information grouped AVP

Grouped AVP format as defined in TS 32.299:

~~Strikethrough~~ formatted AVPs are not included in CCR. *Italic* formatted AVPs listed at the end are not defined in TS 32.299.

For a description and format of the AVPs embedded in the grouped PS-Information AVP, see Table 2: Diameter Gy CCR: top level AVP description and Table 3: Diameter Gy CCR: top level AVP format .

```
  PS-Information :: = < AVP Header: 874>
                      [ 3GPP-Charging-Id ]
                      ~~[ PDN-Connection-ID ]~~
~~[ Node-Id ]~~
~~[ 3GPP-PDP-Type ]~~
~~[ PDP-Address ]~~
~~[ Dynamic-Address-Flag ]~~
~~[ QoS-Information ]~~
~~[ SGSN-Address ]~~
                      [ GGSN-Address ]
                      ~~[ CG-Address ]~~
~~[ Serving-Node-Type ]~~
~~[ SGW-Change ]~~
~~[ 3GPP-IMSI-MCC-MNC ]~~
~~[ IMSI-Unauthenticated-Flag ]~~
~~[ 3GPP-GGSN-MCC-MNC ]~~
                      [ 3GPP-NSAPI ]
                      [ Called-Station-Id ]
                      [ 3GPP-Session-Stop-Indicator ]
                      [ 3GPP-Selection-Mode ]
                      [ 3GPP-Charging-Characteristics ]
                      ~~[ Charging-Characteristics-Selection-Mode ]~~
~~[ 3GPP-SGSN-MCC-MNC ]~~
~~[ 3GPP-MS-TimeZone ]~~
                    * [ Charging-Rule-Base-Name ]
                      ~~[ 3GPP-User-Location-Info ]~~
~~[ User-CSG-Information ]~~
~~[ 3GPP2-BSID ]~~
                      [ 3GPP-RAT-Type ]
                      ~~[ PS-Furnish-Charging-Information ]~~
                      [ PDP-Context-Type ]
                      ~~[ Offline-Charging ]~~
```

```
                    * [ Traffic-Data-Volumes ]
                    * [ Service-Data-Container ]
[ User-Equipment-Info ]
[ Terminal-Information ]
[ Start-Time ]
[ Stop-Time ]
[ Change-Condition ]
[ Diagnostics ]
[ Framed-IP-Address ]
[ Framed-IPv6-Prefix ]
[ Delegated-IPv6-Prefix ]
[ Alc-IPv6-Address ]
[ 3GPP-IMSI ]
[ 3GPP-GPRS-Negotiated-QoS-profile ]
[ 3GPP-GGSN-Address ]
 [ 3GPP-GGSN-IPv6-Address ]
```

2.2 Diameter Gy – Credit-Control-Answer (CCA) command

This section describes the Diameter Gy CCA message format as defined in RFC 4006. ~~Strikethrough~~ formatted AVPs should not appear or are ignored in CCA. *Italic* formatted AVPs listed after [AVP] are not defined in RFC 4006.

```
 <Credit-Control-Answer> ::= < Diameter Header: 272, PXY >
                                  < Session-Id >
                                  { Result-Code }
                                  { Origin-Host }
                                  { Origin-Realm }
                                  { Auth-Application-Id }
                                  { CC-Request-Type }
                                  { CC-Request-Number }
                                  [ User-Name ]
                                  [ CC-Session-Failover ]
                                  [ CC-Sub-Session-Id ]
[ Acct-Multi-Session-Id ]
[ Origin-State-Id ]
[ Event-Timestamp ]
[ Granted-Service-Unit ]
                                 *[ Multiple-Services-Credit-Control ]
                                  [ Cost-Information]
[ Final-Unit-Indication ]
[ Check-Balance-Result ]
                                  [ Credit-Control-Failure-Handling ]
                                  [ Direct-Debiting-Failure-Handling ]
[ Validity-Time]
                                 *[ Redirect-Host]
[ Redirect-Host-Usage ]
[ Redirect-Max-Cache-Time ]
                                 *[ Proxy-Info ]
                                 *[ Route-Record ]
                                 *[ Failed-AVP ]
                                 *[ AVP ]
                                  [ Charging-Rule-Base-Name ]
```

2.2.1 Diameter Gy – CCA message top level AVPs

Table 14: Diameter Gy CCA: top level AVP description provides a detailed description for each top level AVP present in a Diameter Gy CCA message. Unless mentioned different in the description, the AVP is present in Initial, Update and Terminate messages. Grouped AVPs are marked with "↳ (grouped AVP)". The grouped AVP format and embedded AVP description and format are described in section Diameter Gy – CCR message grouped AVPs .

Table 14: Diameter Gy CCA: top level AVP description

AVP code	AVP name	Description
258	Auth-Application-Id	Fixed value: 4 = Diameter Credit Control Application
263	Session-id	A session is a logical concept at the application layer that exists between the Diameter client and the Diameter server; it is identified via the Session-Id AVP. Format: <DiameterIdentity>;<high 32 bits>;<low 32 bits> • <DiameterIdentity> is the configured origin host • <high 32 bits> are encoded as the Diameter initialization time (the number of seconds since 1 Jan 1970) • <low 32 bits> are encoded as a sequentially increasing number starting at 1 Example: bng.nokia.com;1326398325;1
264	Origin-Host	Diameter Identity. Used as destination host in the next Diameter message. Example: server.nokia.com
268	Result-Code	Values: 2001 = Diameter Success 3xxx = Protocol Errors 4001 = Diameter Authentication Rejected 4010 = Diameter End User Service Denied (CCA-U only) 4011 = Diameter Credit Control Not Applicable 4012 = Diameter Credit Limit Reached (CCA-U only) 5003 = Diameter Authorization Rejected 5030 = Diameter User Unknown 5031 = Diameter Rating Failed (CCA-U only) Values not listed result in a Diameter Session Failure and the Credit Control Failure Handling action is executed.

AVP code	AVP name	Description
278	Failed-AVP ↳ (grouped AVP)	Provides debugging information when CCR is rejected or not fully processed because of unsupported AVP or AVP value.
296	Origin-Realm	Diameter Identity. Used as destination host in the next Diameter message. Example: nokia.com
415	CC-Request-Number	Values: CCA-Initial: 0 CCA-Update and CCA-Termination: sequence number
416	CC-Request-Type	Values: 1 = Initial Answer 2 = Update Answer 3 = Termination Answer
418	CC-Session-Failover	Specifies if a secondary peer should be attempted in case of Credit Control Failure Handling. Overrides the configured failover value in **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **on-failure [failover {enabled | disabled}] [handling {continue | retry-and-terminate | terminate}]** Values: 0 = Failover Not Supported 1 = Failover Supported
427	Credit-Control-Failure-Handling	Action to take when the Credit Control client does not receive a valid CCA message within the interval specified with tx-timer (default 10s). Overrides the configured failure handling: **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **on-failure [failover {enabled | disabled}] [handling {continue | retry-and-terminate | terminate}]** Values: 0 = Terminate 1 = Continue 2 = Retry and terminate
456	Multiple-Services-Credit-Control	Up to sixteen Multiple-Services-Credit-Control AVPs, each corresponding to a rating group. A rating group maps to a category configured in a category-map:

AVP code	AVP name	Description
	↳ (grouped AVP)	**configure subscriber-mgmt category-map** *category-map-name* **category** *category-name* **rating-group** *rating-group-id*
3GPP – 1004	Charging-Rule-Base-Name	(CCA-I only) Assigns the category-map or overrides the category-map obtained in authentication. value: category-map-name: the name of the category-map to be used for this session

Table 15: Diameter Gy CCA: top level AVP format

AVP code	AVP name	Standard	Data format	Flags
258	Auth-Application-Id	RFC 6733/RFC 4006	Unsigned 32	M
263	Session-id	RFC 6733	UTF8 String	M
264	Origin-Host	RFC 6733	Diameter Identity	M
268	Result-Code	RFC 6733/RFC 4006	Unsigned 32	M
278	Failed-AVP ↳ (grouped AVP)	RFC 6733	Grouped	M
296	Origin-Realm	RFC 6733	Diameter Identity	M
415	CC-Request-Number	RFC 4006	Unsigned 32	M
416	CC-Request-Type	RFC 4006	Enumerated	M
418	CC-Session-Failover	RFC 4006	Enumerated	M
427	Credit-Control-Failure-Handling	RFC 4006	Enumerated	M
456	Multiple-Services-Credit-Control ↳ (grouped AVP)	RFC 4006	Grouped	M
3GPP – 1004	Charging-Rule-Base-Name	TS 29.212	Octet String	V, M

2.2.2 Diameter Gy – CCA message grouped AVPs

This section provides an overview of CCA message grouped AVPs.

2.2.2.1 Diameter Gy CCA – Failed-AVP grouped AVP

Grouped AVP format as defined in RFC 6733:

```
<Failed-AVP> ::= < AVP Header: 279 >
                      1* {AVP}
```

The failed-AVP AVP contains the entire AVP that could not be processed successfully.

2.2.2.2 Diameter Gy CCA – Multiple-Services-Credit-Control grouped AVP

Grouped AVP format as defined in RFC 4006: ~~Strikethrough~~ formatted AVPs should not appear or are ignored in CCA. *Italic* formatted AVPs listed after [AVP] are not defined in RFC 4006.

```
  Multiple-Services-Credit-Control ::= < AVP Header: 456 >
                                         [ Granted-Service-Unit ]
                                         ~~[ Requested-Service-Unit ]~~
                                        *~~[ Used-Service-Unit ]~~
~~[ Tariff-Change-Usage ]~~
                                        *~~[ Service-Identifier ]~~
                                         [ Rating-Group ]
                                        *~~[ G-S-U-Pool-Reference ]~~
                                         [ Validity-Time ]
                                         [ Result-Code ]
                                         [ Final-Unit-Indication ]
                                        *[ AVP ]
                                         [ Time-Quota-Threshold ]
[ Volume-Quota-Threshold ]
[ Quota-Holding-Time ]
```

Table 16: Diameter Gy CCA: Multiple-Services-Credit-Control grouped AVP description

AVP code	AVP name	Description
268	Result-Code	Values: 2001 = Diameter Success 4010 = Diameter End User Service Denied 4011 = Diameter Credit Control Not Applicable 4012 = Diameter Credit Limit Reached 5003 = Diameter Authorization Rejected 5031 = Diameter Rating Failed Values not listed result in a Diameter Session Failure and the Credit Control Failure Handling action is executed.
430	Final-Unit-Indication ↳ (grouped AVP)	This AVP indicates that the Granted-Service-Unit contains the final units for the service. When this quota is consumed, a final reporting is started (CCR-U or CCR-T) with reporting reason “Final”. The final reporting can be disabled with **configure subscriber-mgmt diameter-application-policy** *application-policy-name* **gy out-of-credit-reporting quota-exhausted**

AVP code	AVP name	Description
431	Granted-Service-Unit ↳ (grouped AVP)	Amount of service units that the Diameter credit control client can provide to the end user until the service must be released or a new CCR message must be sent.
432	Rating-Group	Rating group for which the quota is allocated. Corresponds with a category within a category-map defining the queues/policers and direction to monitor. **configure subscriber-mgmt category-map** *category-map-name* **category** *category-name* **rating-group** *rating-group-id*
448	Validity-Time	If the granted service units have not been consumed within the validity time, a CCR-U is triggered with Reporting Reason AVP set to 4 (Validity Time). Value in seconds
3GPP – 868	Time-Quota-Threshold	Threshold preventing time quota exhaustion before refreshing. When the used time quota exceeds the threshold, a CCR-U is triggered with Reporting Reason AVP set to 0 (Threshold). Value in seconds
3GPP – 869	Volume-Quota-Threshold	Threshold preventing volume quota exhaustion before refreshing. When the used volume quota exceeds the threshold, a CCR-U is triggered with Reporting Reason AVP set to 0 (Threshold). Value in octets
3GPP – 871	Quota-Holding-Time	Specifies an idle-timeout associated with the granted service units. If no traffic associated with the quota is observed for the time specified by the quota holding time, then a CCR-U is triggered with Reporting Reason AVP set to 1 (Quota Holding Time). The idle time is measured per sampling period. Value in seconds

Table 17: Diameter Gy CCA: Multiple-Services-Credit-Control grouped AVP format

AVP code	AVP name	Standard	Data format	Flags
268	Result-Code	RFC 6733/RFC 4006	Unsigned 32	M
430	Final-Unit-Indication ↳ (grouped AVP)	RFC 4006	Grouped	M
431	Granted-Service-Unit ↳ (grouped AVP)	RFC 4006	Grouped	M
432	Rating-Group	RFC 4006	Unsigned 32	M

AVP code	AVP name	Standard	Data format	Flags
448	Validity-Time	RFC 4006	Unsigned 32	M
3GPP – 868	Time-Quota-Threshold	TS 32.299	Unsigned 32	V, M
3GPP – 869	Volume-Quota-Threshold	TS 32.299	Unsigned 32	V, M
3GPP – 871	Quota-Holding-Time	TS 32.299	Unsigned 32	V, M

2.2.2.3 Diameter Gy CCA – Final-Unit-Indication grouped AVP

Grouped AVP format as defined in RFC 4006: ~~Strikethrough~~ formatted AVPs should not appear or are ignored in CCA.

```
Final-Unit-Indication ::= < AVP Header: 430 >
                            { Final-Unit-Action }
                           *~~[ Restriction-Filter-Rule ]~~
                           *~~[ Filter-Id ]~~
                            [ Redirect-Server ]
```

Table 18: Diameter Gy CCA: Final-Unit-Indication grouped AVP description

AVP code	AVP name	Description
443	Redirect-Server ↳ (grouped AVP)	This AVP is included when the Final-Unit-Action AVP is set to REDIRECT (1) and contains the URL to which the user must be redirected. The URL overrides the URL specified with **configure subscriber-mgmt category-map** *category-map-name* **category** *category-name* **exhausted-credit-service-level ingress-ip-filter-entries entry** *entry-id* **action http-redirect** *url* **allow-override**. The AVP is ignored when the out-of-credit action is different from change-service-level or when no http-redirect action with **allow-override** is configured.
449	Final-Unit-Action	If the value is Terminate, then the session is terminated and the corresponding subscriber host deleted. If the value is Redirect or Restrict Access, then the out-of-credit action as configured for that rating group (category) is executed: **configure subscriber-mgmt credit-control-policy** *policy-name* **out-of-credit-action change-service-level {continue | disconnect-host | block-category | change-service-level}**

AVP code	AVP name	Description
		or **configure subscriber-mgmt category-map** *category-map-name* **category** *category-name* **out-of-credit-action-override {continue | block-category | change-service- level}** Values: 0 = Terminate 1 = Redirect 2 = Restrict Access

Table 19: Diameter Gy CCA: Final-Unit-Indication grouped AVP format

AVP code	AVP name	Standard	Data format	Flags
443	Redirect-Server ↳ (grouped AVP)	RFC 4006	Enumerated	M
449	Final-Unit-Action	RFC 4006	Enumerated	M

2.2.2.4 DIAMETER Gy CCA - Redirect-Server grouped AVP

Grouped AVP format as defined in RFC 4006.

```
Redirect-Server ::= < AVP Header: 434 >
                    { Redirect-Address-Type }
                    { Redirect-Server-Address }
```

Table 20: Diameter Gy CCA: Redirect-Server grouped AVP description

AVP code	AVP name	Description
433	Redirect-Address-Type	Must be set to URL (2). The Redirect-Server-Address AVP is ignored when set to a different value.
435	Redirect-Server-Address	Contains the IPv4 HTTP redirect URL that is used when the Final-Unit-Action REDIRECT is triggered for the rating group that corresponds with the MSCC in which the Final-Unit-Indication AVP is included. The URL specified in the Redirect-Server-Address AVP is only used when all following conditions are met: • The Final-Unit-Indication AVP is present in the Multiple-Services-Credit-Control AVP

AVP code	AVP name	Description
		• The Final-Unit-Action is set to REDIRECT (1) • The Redirect-Address-Type is set to URL (2) • The out-of-credit action for the corresponding rating group is set to change-service-level: **configure subscriber-mgmt credit-control-policy** *policy-name* **out-of-credit-action change-service-level** or **configure subscriber-mgmt category-map** *category-map-name* **category** *category-name* **out-of-credit-action-override change-service-level** • An IPv4 HTTP redirect action with allow-override is specified as exhausted-credit-service-level for the corresponding rating group: **configure subscriber-mgmt category-map** *category-map-name* **category** *category-name* **exhausted-credit-service-level ingress-ip-filter-entries entry** *entry-id* **action http-redirect url allow-override**
435 (continued)		In all other cases, the Redirect-Server-Address AVP is ignored. The maximum URL length is 255 characters and can include the same macro substitutions such as $IP (customer's IP address), $MAC (customer's MAC address), $URL (original requested URL), as supported for a static configured HTTP redirect URL.

Table 21: Diameter Gy CCA: Redirect-Server grouped AVP format

AVP code	AVP name	Standard	Data format	Flags
433	Redirect-Address-Type	RFC 4006	Enumerated	M
435	Redirect-Server-Address	RFC 4006	Enumerated	M

2.2.2.5 Diameter Gy CCA – Granted-Service-Unit grouped AVP

Grouped AVP format as defined in RFC 4006. ~~Strikethrough~~ formatted AVPs should not appear or are ignored in CCA.

```
Granted-Service-Unit ::= < AVP Header: 431 >
                                ~~[ Tariff-Time-Change ]~~
```

```
                                    [ CC-Time ]
                                    { CC-Money }
                                    [ CC-Total-Octets ]
                                    { CC-Input-Octets }
{ CC-Output-Octets }
{ CC-Service-Specific-Units }
                                   *{ AVP }
```

For a single rating group (category), either Volume or Time quota can be granted. Granting both time and volume quota for a single rating group is not supported and results in a Diameter Session Failure and the execution of the Credit Control Failure Handling action.

Table 22: Diameter Gy CCA: Granted-Service-Unit grouped AVP description

AVP code	AVP name	Description
420	CC-Time	Amount of granted time Value: in seconds
421	CC-Total-Octets	Total number of octets regardless of the direction (quota can be consumed for ingress or egress) Value: in octets

Table 23: Diameter Gy CCA: Granted-Service-Unit grouped AVP format

AVP code	AVP name	Standard	Data format	Flags
420	CC-Time	RFC 4006	Unsigned 32	M
421	CC-Total-Octets	RFC 4006	Unsigned 64	M

2.3 Diameter Gy – Re-Auth-Request (RAR) command

2.3.1 Diameter Gy – RAR message format

This section describes the Diameter Gy RAR message format as defined in RFC 6733. ~~Strikethrough~~ formatted AVPs should not appear or are ignored in RAR.

A RAR message triggers an intermediate interrogation (CCR-U) with Reporting-Reason set to “Forced Reauthorization”.

```
 <RAR>  ::= < Diameter Header: 258, REQ, PXY >
                    < Session-Id >
                    { Origin-Host }
                    { Origin-Realm }
                    { Destination-Realm }
                    { Destination-Host }
                    { Auth-Application-Id }
                    { Re-Auth-Request-Type }
                    { User-Name }
{ Origin-State-Id }
                   * { Proxy-Info }
```

```
                    * [ Route-Record ]
                    * [ AVP ]
```

2.3.2 Diameter Gy – RAR message top level AVPs

Table 24: Diameter Gy RAR: top level AVP description provides a detailed description for each top level AVP present in a Diameter Gy RAR message.

Table 24: Diameter Gy RAR: top level AVP description

AVP code	AVP name	Description
258	Auth-Application-Id	Fixed value: 4 = Diameter Credit Control Application
263	Session-id	A session is a logical concept at the application layer that exists between the Diameter client and the Diameter server; it is identified via the Session-Id AVP. Format: <DiameterIdentity>;<high 32 bits>;<low 32 bits> • <DiameterIdentity> is the configured origin host • <high 32 bits> are encoded as the Diameter initialization time (the number of seconds since 1 January, 1970) • <low 32 bits> are encoded as a sequentially increasing number starting at 1 Example: bng.nokia.com;1326398325;1
264	Origin-Host	Diameter Identity. Used as destination host in the next Diameter message. Example: server.nokia.com
283	Destination-Realm	Diameter Identity. Example: nokia.com
285	Re-Auth-Request-Type	Values: 0 = Authorize-Only
293	Destination-Host	Diameter Identity. Example: bng.nokia.com
296	Origin-Realm	Diameter Identity. Used as destination realm in the next Diameter message. Example: nokia.com

Table 25: Diameter Gy RAR: top level AVP format

AVP code	AVP name	Standard	Data format	Flags
258	Auth-Application-Id	RFC 6733/RFC 4006	Unsigned 32	M
263	Session-id	RFC 6733	UTF8 String	M
264	Origin-Host	RFC 6733	Diameter Identity	M
283	Destination-Realm	RFC 6733	Diameter Identity	M
285	Re-Auth-Request-Type	RFC 6733	Enumerated	M
293	Destination-Host	RFC 6733	Diameter Identity	M
296	Origin-Realm	RFC 6733	Diameter Identity	M

2.4 Diameter Gy – Re-Auth-Answer (RAA) command

2.4.1 Diameter Gy – RAA message format

This section describes the Diameter Gy RAA message format as defined in RFC 6733. ~~Strikethrough~~ formatted AVPs are not included in RAA.

```
 <RAA>  ::= < Diameter Header: 258, PXY >
                    < Session-Id >
                    { Result-Code }
                    { Origin-Host }
                    { Origin-Realm }
                    ~~[ User-Name ]~~
~~[ Origin-State-Id ]~~
~~[ Error-Message ]~~
~~[ Error-Reporting-Host ]~~
~~[ Failed-AVP ]~~
                  * ~~[ Redirect-Host ]~~
~~[ Redirect-Host-Usage ]~~
~~[ Redirect-Max-Cache-Time ]~~
                  * ~~[ Proxy-Info ]~~
                  * ~~[ AVP ]~~
```

2.4.2 Diameter Gy – RAA message top level AVPs

Table 26: Diameter Gy RAA: top level AVP description provides a detailed description for each top level AVP present in a Diameter Gy RAA message.

Table 26: Diameter Gy RAA: top level AVP description

AVP code	AVP name	Description
263	Session-id	A session is a logical concept at the application layer that exists between the Diameter client and the Diameter server; it is identified via the Session-Id AVP. Format: <DiameterIdentity>;<high 32 bits>;<low 32 bits> • <DiameterIdentity> is the configured origin host • <high 32 bits> are encoded as the Diameter initialization time (the number of seconds since 1 January, 1970) • <low 32 bits> are encoded as a sequentially increasing number starting at 1 Example: bng.nokia.com;1326398325;1
264	Origin-Host	Diameter Identity. As configured in the corresponding diameter-peer-policy Example: bng.nokia.com
268	Result-Code	Values: 2002 = Diameter Limited Success 5002 = Diameter Unknown Session ID 5012 = Diameter Unable To Comply - AVP parsing errors or message errors
296	Origin-Realm	Diameter Identity. As configured in the corresponding diameter-peer-policy Example: nokia.com

Table 27: Diameter Gy RAA: top level AVP format

AVP code	AVP name	Standard	Data format	Flags
263	Session-id	RFC 6733	UTF8 String	M
264	Origin-Host	RFC 6733	Diameter Identity	M
268	Result-Code	RFC 6733/RFC 4006	Unsigned 32	M
296	Origin-Realm	RFC 6733	Diameter Identity	M

2.5 Diameter Gy – Abort-Session-Request (ASR) command

2.5.1 Diameter Gy – ASR message format

This section describes the Diameter Gy ASR message format as defined in RFC 6733. ~~Strikethrough~~ formatted AVPs should not appear or are ignored in ASR.

An Abort-Session-Request message triggers a deletion of the Diameter session: an Abort-Session-Answer is generated, followed by a CCR-T. The corresponding subscriber host is deleted from the system.

```
 <ASR>  ::= < Diameter Header: 274, REQ, PXY >
                    < Session-Id >
                    { Origin-Host }
                    { Origin-Realm }
                    { Destination-Realm }
                    { Destination-Host }
                    { Auth-Application-Id }
                    [ User-Name ]
[ Origin-State-Id ]
                  * [ Proxy-Info ]
                  * [ Route-Record ]
                  * [ AVP ]
```

2.5.2 Diameter Gy – ASR message top level AVPs

Table 28: Diameter Gy ASR: top level AVP description provides a detailed description for each top level AVP present in a Diameter Gy ASR message.

Table 28: Diameter Gy ASR: top level AVP description

AVP code	AVP name	Description
258	Auth-Application-Id	Fixed value: 4 = Diameter Credit Control Application
263	Session-id	A session is a logical concept at the application layer that exists between the Diameter client and the Diameter server; it is identified via the Session-Id AVP. Format: <DiameterIdentity>;<high 32 bits>;<low 32 bits> • <DiameterIdentity> is the configured origin host • <high 32 bits> are encoded as the Diameter initialization time (the number of seconds since 1 Jan 1970) • <low 32 bits> are encoded as a sequentially increasing number starting at 1 Example:

AVP code	AVP name	Description
		bng.nokia.com;1326398325;1
264	Origin-Host	Diameter Identity. Used as destination host in the next Diameter message. Example: server.nokia.com
283	Destination-Realm	Diameter Identity. Example: nokia.com
293	Destination-Host	Diameter Identity. Example: bng.nokia.com
296	Origin-Realm	Diameter Identity. Used as destination realm in the next Diameter message. Example: nokia.com

Table 29: Diameter Gy ASR: top level AVP format

AVP code	AVP name	Standard	Data format	Flags
258	Auth-Application-Id	RFC 6733/RFC 4006	Unsigned 32	M
263	Session-id	RFC 6733	UTF8 String	M
264	Origin-Host	RFC 6733	Diameter Identity	M
283	Destination-Realm	RFC 6733	Diameter Identity	M
293	Destination-Host	RFC 6733	Diameter Identity	M
296	Origin-Realm	RFC 6733	Diameter Identity	M

2.6 Diameter Gy – Abort-Session-Answer (ASA) command

2.6.1 Diameter Gy – ASA message format

This section describes the Diameter Gy ASA message format as defined in RFC 6733. ~~Strikethrough~~ formatted AVPs are not included in ASA.

```
 <ASA>  ::= < Diameter Header: 274, PXY >
                    < Session-Id >
                    { Result-Code }
                    { Origin-Host }
                    { Origin-Realm }
                    [ User-Name ]
[ Origin-State-Id ]
[ Error-Message ]
```

```
[ Error-Reporting-Host ]
[ Failed-AVP ]
                  * [ Redirect-Host ]
[ Redirect-Host-Usage ]
[ Redirect-Max-Cache-Time ]
                  * [ Proxy-Info ]
                  * [ AVP ]
```

2.6.2 Diameter Gy – ASA message top level AVPs

Table 30: Diameter Gy ASA: top level AVP description provides a detailed description for each top level AVP present in a Diameter Gy ASA message.

Table 30: Diameter Gy ASA: top level AVP description

AVP code	AVP name	Description
263	Session-id	A session is a logical concept at the application layer that exists between the Diameter client and the Diameter server; it is identified via the Session-Id AVP. Format: <DiameterIdentity>;<high 32 bits>;<low 32 bits> • <DiameterIdentity> is the configured origin host • <high 32 bits> are encoded as the Diameter initialization time (the number of seconds since 1 Jan 1970) • <low 32 bits> are encoded as a sequentially increasing number starting at 1 Example: bng.nokia.com;1326398325;1
264	Origin-Host	Diameter Identity. As configured in the corresponding diameter-peer-policy Example: bng.nokia.com
268	Result-Code	Values: 2002 = Diameter Limited Success 5002 = Diameter Unknown Session ID 5012 = Diameter Unable To Comply — AVP parsing errors or message errors
296	Origin-Realm	Diameter Identity. As configured in the corresponding diameter-peer-policy Example: nokia.com

Table 31: Diameter Gy ASA: top level AVP format

AVP code	AVP name	Standard	Data format	Flags
263	Session-id	RFC 6733	UTF8 String	M
264	Origin-Host	RFC 6733	Diameter Identity	M
268	Result-Code	RFC 6733/RFC 4006	Unsigned 32	M
296	Origin-Realm	RFC 6733	Diameter Identity	M

3 Standards and protocol support

Note:
The information provided in this chapter is subject to change without notice and may not apply to all platforms.

Nokia assumes no responsibility for inaccuracies.

3.1 Access Node Control Protocol (ANCP)

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3GPP Release 12, *ADC rules over Gx interfaces*

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RFC 5882, *Generic Application of Bidirectional Forwarding Detection (BFD)*

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RFC 7880, *Seamless Bidirectional Forwarding Detection (S-BFD)*

RFC 7881, *Seamless Bidirectional Forwarding Detection (S-BFD) for IPv4, IPv6, and MPLS*

RFC 7883, *Advertising Seamless Bidirectional Forwarding Detection (S-BFD) Discriminators in IS-IS*

RFC 7884, *OSPF Extensions to Advertise Seamless Bidirectional Forwarding Detection (S-BFD) Target Discriminators*

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RFC 2385, *Protection of BGP Sessions via the TCP MD5 Signature Option*

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RFC 2545, *Use of BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing*

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RFC 4684, *Constrained Route Distribution for Border Gateway Protocol/MultiProtocol Label Switching (BGP/MPLS) Internet Protocol (IP) Virtual Private Networks (VPNs)*

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RFC 5492, *Capabilities Advertisement with BGP-4*

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RFC 6810, *The Resource Public Key Infrastructure (RPKI) to Router Protocol*

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RFC 7752, *North-Bound Distribution of Link-State and Traffic Engineering (TE) Information Using BGP*

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RFC 7911, *Advertisement of Multiple Paths in BGP*

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RFC 8212, *Default External BGP (EBGP) Route Propagation Behavior without Policies*

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3.8 Ethernet

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IEEE 802.1aq, *Shortest Path Bridging*

IEEE 802.1ax, *Link Aggregation*

IEEE 802.1D, *MAC Bridges*

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RFC 9136, *IP Prefix Advertisement in Ethernet VPN (EVPN)*

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RFC 3719, *Recommendations for Interoperable Networks using Intermediate System to Intermediate System (IS-IS)*

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RFC 5309, *Point-to-Point Operation over LAN in Link State Routing Protocols*

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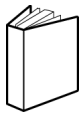
Customer document and product support



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Customer documentation welcome page

Technical support

Product support portal

Documentation feedback

Customer documentation feedback