Oracle® Communications Billing and Revenue Management

Elastic Charging Engine 11.3 Diameter Gateway Protocol Implementation Conformance Statement

Release 7.5

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Preface

This guide serves as a protocol implementation compliance statement (PICS) for Oracle Communications Billing and Revenue Management (BRM) Elastic Charging Engine (ECE) Diameter Gateway. Each chapter lists the supported messages and attribute-value pairs (AVPs) for the specific protocol.

Audience

This guide is intended for system administrators, product integrators, and developers. Readers must be familiar with the following:

- Elastic Charging Engine
- Diameter protocol

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http://docs.oracle.com

Additional Oracle Communications documentation is available from the Oracle software delivery website:

https://edelivery.oracle.com

Document Revision History

The following table lists the revision history for this book.

Version	Date	Description
E70772-01	April 2016	Initial release.
E70772-02	September 2016	Documentation updates for ECE 11.3 Patch Set 1. ■ Updated the following section: Section Compliance
E70772-03	December 2016	Documentation updates for ECE 11.3 Patch Set 2. ■ Updated the following section: Gy Top-Up Request AVPs
E70772-04	August 2017	Documentation updates for ECE 11.3 Patch Set 4. ■ Updated the following section: Section Compliance
E70772-05	March 2018	Documentation updates for ECE 11.3 Patch Set 7. ■ Updated the following section in "Diameter Credit-Control Application Protocol": Section Compliance ■ Updated the following section in "Diameter Gy Protocol": Section Compliance

1

Diameter Base Protocol

This chapter describes how Oracle Communications Billing and Revenue Management (BRM) Elastic Charging Engine (ECE) Diameter Gateway maps the diameter messages for Diameter Base Protocol defined in RFC-3588. For more information, see the Diameter Base protocol specification detail:

https://www.rfc-editor.org/info/rfc3588

Section Compliance

Table 1–1 lists the compliance information for Diameter Base protocol sections.

Table 1–1 Diameter Base Protocol Section Compliance

Section Number	Section	Status	Notes
1	Introduction	Not applicable	-
1.1	Diameter Protocol	Not applicable	-
1.1.1	Description of the document set	Not applicable	-
1.2	Approach to extensibility	Not applicable	-
1.2.1	Defining new attribute-value pair (AVP) values	Not applicable	-
1.2.2	Creating new AVPs	Not applicable	-
1.2.3	Creating new authentication applications	Not applicable	-
1.2.4	Creating new accounting applications	Not applicable	-
1.2.5	Application authentication procedures	Not applicable	-
1.3	Terminology	Not applicable	-
2	Protocol overview	Not applicable	-
2.1	Transport	Supported	Supports Transmission Control Protocol (TCP) and Stream Control Transmission Protocol (SCTP).
2.1.1	Stream control transmission protocol guidelines	Supported	-
2.2	Securing diameter messages	Not supported	-
2.3	Diameter application compliance	Supported	-
2.4	Application identifiers	Supported	-

Table 1–1 (Cont.) Diameter Base Protocol Section Compliance

Section Number	Section	Status	Notes
2.5	Connections vs Sessions	No requirement	-
2.6	Peer table	Supported	-
2.7	Realm-based routing table	Not applicable	-
2.8	Role of diameter agents	Not applicable	-
2.8.1	Relay agents	Not applicable	-
2.8.2	Proxy agents	Not applicable	-
2.8.3	Redirect agents	Not applicable	-
2.8.4	Translation agents	Not applicable	-
2.9	End-to-end security framework	Not supported	-
2.10	Diameter path authorization	Not supported	-
3	Diameter header	Supported	-
3.1	Command codes	Supported	-
3.2	Command code augmented backus–naur form (ABNF) specification	No requirement	-
3.3	Diameter command naming conventions	Supported	-
4	Diameter AVPs	Supported	-
4.1	AVP header	Supported	-
4.1.1	Optional header elements	Supported	-
4.2	Basic AVP	Supported	-
4.3	Derived AVP data formats	Supported	-
4.4	Grouped AVP values	Supported	-
4.4.1	Example AVP with a grouped data type	No requirement	-
4.5	Diameter base protocol AVPs	Supported	-
5	Diameter peers	No requirement	-
5.1	Peer connections	Supported	-
5.2	Diameter peer discovery	Not supported	Diameter Gateway does not support routing, proxy, or relay
5.3	Capabilities exchange	Supported	-
5.3.1	Capabilities-Exchange-Request	Supported	-
5.3.2	Capabilities-Exchange-Answer	Supported	-
5.3.3	Vendor-Id AVP	Supported	-
5.3.4	Firmware-Revision AVP	Supported	-
5.3.5	Host-IP-Address AVP	Not supported	-
5.3.6	Supported-Vendor-Id AVP	Supported	-
5.3.7	Product-Name AVP	Supported	-

Table 1–1 (Cont.) Diameter Base Protocol Section Compliance

Section Number	Section	Status	Notes
5.4	Disconnecting peer connections	Partially supported	Diameter Gateway does not generate this message but only responds to it.
5.4.1	Disconnect-Peer-Request	Partially supported	Diameter Gateway does not generate this message but only responds to it.
5.4.2	Disconnect-Peer-Answer	Partially supported	Diameter Gateway does not generate this message but only responds to it.
5.4.3	Disconnect-Cause AVP	Partially supported	Diameter Gateway does not generate this message but only responds to it.
5.5	Transport failure detection	Supported	-
5.5.1	Device-Watchdog-Request	Supported	-
5.5.2	Device-Watchdog-Answer	Supported	-
5.5.3	Transport failure algorithm	Supported	-
5.5.4	Failover and failback procedures	Partially supported	-
5.6	Peer state machine	Supported	-
5.6.1	Incoming connections	Supported	-
5.6.2	Events	Supported	-
5.6.3	Actions	Supported	-
5.6.4	The election process	Supported	-
6	Diameter message processing	No requirement	-
6.1	Diameter request routing overview	No requirement	-
6.1.1	Originating a request	Supported	-
6.1.2	Sending a request	Supported	-
6.1.3	Receiving requests	Supported	-
6.1.4	Processing local requests	Not supported	-
6.1.5	Request forwarding	Not supported	-
6.1.6	Request routing	Not applicable	-
6.1.7	Redirecting requests	Not applicable	-
6.1.8	Relaying and proxying requests	Not applicable	-
6.2	Diameter answer processing	Supported	-
6.2.1	Processing received answers	Supported	-
6.2.2	Relaying and proxying answers	Not applicable	Configurable per Diameter Gateway instance
6.3	Origin-Host AVP	Supported	Configurable per Diameter Gateway instance
6.4	Origin-Realm AVP	Supported	-
6.5	Destination-Host AVP	Supported	-
6.6	Destination-Realm AVP	Supported	-

Table 1–1 (Cont.) Diameter Base Protocol Section Compliance

Section Number	Section	Status	Notes
6.7	Routing AVPs	Not applicable	-
6.7.1	Route-Record AVP	Not applicable	-
6.7.2	Proxy-Info AVP	Not applicable	-
6.7.3	Proxy-Host AVP	Not applicable	-
6.7.4	Proxy-State AVP	Not applicable	-
6.8	Auth-Application-Id AVP	Supported	-
6.9	Acct-Application-Id AVP	Not applicable	-
6.10	Inband-Security-Id AVP	Supported	Supports only 0, where 0 specifies NO_INBAND_ SECURITY
6.11	Vendor-Specific-Application-Id AVP	Supported	-
6.12	Redirect-Host AVP	Not applicable	-
6.13	Redirect-Host-Usage AVP	Not applicable	-
6.14	Redirect-Max-Cache-Time AVP	Not applicable	-
6.15	E2E-Sequence AVP	Not applicable	-
7	Error handling	Supported	-
7.1	Result-Code AVP	Supported	-
7.1.1	Informational	Supported	-
7.1.2	Success	Supported	-
7.1.3	Protocol errors	Supported	-
7.1.4	Transient Failures	Supported	-
7.1.5	Permanent Failures	Supported	-
7.2	Error bit	Supported	-
7.3	Error-Message AVP	Not supported	-
7.4	Error-Reporting-Host AVP	Not supported	-
7.5	Failed-AVP AVP	Supported	-
7.6	Experimental-Result AVP	Supported	-
7.7	Experimental-Result-Code AVP	Supported	-
8	Diameter user sessions	No requirement	-
8.1	Authorization session state machine	Supported	-
8.2	Accounting session state machine	Not applicable	-
8.3	Server-Initiated Re-Auth	Supported	-
8.3.1	Re-Auth-Request	Supported	-
8.3.2	Re-Auth-Answer	Supported	-
8.4	Session termination	Supported	-
8.4.1	Session-Termination-Request	Supported	-
8.4.2	Session-Termination-Answer	Supported	-

Table 1–1 (Cont.) Diameter Base Protocol Section Compliance

Section Number	Section	Status	Notes
8.5	Aborting a session	Not supported	-
8.5.1	Abort-Session-Request	Not supported	-
8.5.2	Abort-Session-Answer	Not supported	-
8.6	Inferring session termination from Origin-State-Id	Not supported	-
8.7	Auth-Request-Type AVP	Not applicable	-
8.8	Session-Id AVP	Supported	-
8.9	Authorization-Lifetime AVP	Not applicable	-
8.10	Auth-Grace-Period AVP	Not applicable	-
8.11	Auth-Session-State AVP	Not applicable	-
8.12	Re-Auth-Request-Type AVP	Not applicable	-
8.13	Session-Timeout AVP	Not applicable	-
8.14	User-Name AVP	Not applicable	-
8.15	Termination-Cause AVP	Supported	-
8.16	Origin-State-Id AVP	Not supported	-
8.17	Session-Binding AVP	Not applicable	-
8.18	Session-Server-Failover AVP	Not applicable	-
8.19	Multi-Round-Time-Out AVP	Not applicable	-
8.20	Class AVP	Not applicable	-
8.21	Event-Timestamp AVP	Supported	-
9	Accounting	Not applicable	-
9.1	Server directed model	Not applicable	-
9.2	Protocol messages	Not applicable	-
9.3	Application document requirements	Not applicable	-
9.4	Fault resilience	Not applicable	-
9.5	Accounting records	Not applicable	-
9.6	Correlation of accounting records	Not applicable	-
9.7	Accounting Command-Codes	Not applicable	-
9.7.1	Accounting-Request	Not applicable	-
9.7.2	Accounting-Answer	Not applicable	-
9.8	Accounting AVPs	Not applicable	-
9.8.1	Accounting-Record-Type AVP	Not applicable	-
9.8.2	Acct-Interim-Interval AVP	Not applicable	-
9.8.3	Accounting-Record-Number AVP	Not applicable	-
9.8.4	Acct-Session-Id AVP	Not applicable	-
9.8.5	Acct-Multi-Session-Id AVP	Not applicable	-
9.8.6	Accounting-Sub-Session-Id AVP	Not applicable	-

Table 1–1 (Cont.) Diameter Base Protocol Section Compliance

Section Number	Section	Status	Notes
9.8.7	Accounting-Realtime-Required AVP	Not applicable	-
10	AVP occurrence table	No requirement	-
10.1	Base protocol command AVP Table	No requirement	-
10.2	Accounting AVP Table	No requirement	-
11	IANA Considerations	No requirement	-
11.1	AVP header	No requirement	-
11.1.1	AVP code	No requirement	-
11.1.2	AVP flags	No requirement	-
11.2	Diameter header	No requirement	-
11.2.1	Command codes	No requirement	-
11.2.2	Command Flags	No requirement	-
11.3	Application identifiers	No requirement	-
11.4	AVP Values	No requirement	-
11.4.1	Result-Code AVP Values	No requirement	-
11.4.2	Accounting-Record-Type AVP Values	No requirement	-
11.4.3	Termination-Cause AVP Values	No requirement	-
11.4.4	Redirect-Host-Usage AVP Values	No requirement	-
11.4.5	Session-Server-Failover AVP Values	No requirement	-
11.4.6	Session-Binding AVP Values	No requirement	-
11.4.7	Disconnect-Cause AVP Values	No requirement	-
11.4.8	Auth-Request-Type AVP Values	No requirement	-
11.4.9	Auth-Session-State AVP Values	No requirement	-
11.4.10	Re-Auth-Request-Type AVP Values	No requirement	-
11.4.11	Accounting-Realtime-Required AVP Values	No requirement	-
11.5	Diameter TCP/SCTP port numbers	No requirement	-
11.6	Naming authority pointer (NAPTR) Service Fields	No requirement	-
12	Diameter Protocol Related Configurable Parameters	Supported	-
13	Security considerations	Not supported	-
13.1	IPsec usage	Not supported	-
13.2	TLS usage	Not supported	-
13.3	Peer-to-Peer Considerations	Not supported	-
14	References	No requirement	-
14.1	Normative References	No requirement	-
14.2	Informative References	No requirement	-
15	Acknowledgements	No requirement	-

Table 1–1 (Cont.) Diameter Base Protocol Section Compliance

Section Number	Section	Status	Notes
Appendix A	Diameter service template	No requirement	-
Appendix B	NAPTR example	No requirement	-
Appendix C	Duplicate detection	Supported	-

2

Diameter Credit-Control Application Protocol

This chapter describes how Oracle Communications Billing and Revenue Management (BRM) Elastic Charging Engine (ECE) Diameter Gateway maps the diameter messages for Diameter Credit-Control Application Protocol defined in RFC-4006. For more information, see the Diameter Credit-Control Application protocol specification detail:

https://www.rfc-editor.org/info/rfc4066

Section Compliance

Table 2–1 lists the compliance information for Diameter Credit-Control Application protocol sections.

Table 2–1 Diameter Credit-Control Application Protocol Section Compliance

Section Number	Section	Status	Notes
1	Introduction	No requirement	-
1.1	Requirements language	No requirement	-
1.2	Terminology	No requirement	-
1.3	Advertising application support	Supported	-
2	Architecture models	Supported	-
3	Credit-Control messages	Supported	-
3.1	Credit-Control-Request (CCR) command	Supported	-
3.2	Credit-Control-Answer (CCA) command	Supported	-
4	Credit-Control Application overview	Supported	Support both reservation and direct debiting
4.1	Service-Specific rating input and interoperability	Supported	-
5	Session based Credit-Control	Supported	-
5.1	General principles	Partially supported	Telecommunications Technology Committee (TTC) is not supported
5.2	First interrogation	Supported	-
5.3	Intermediate interrogation	Supported	-
5.4	Final Interrogation	Supported	-
5.5	Server-Initiated credit Re-Authorization	Supported	-

Table 2–1 (Cont.) Diameter Credit-Control Application Protocol Section Compliance

Section Number	Section	Status	Notes
5.6	Graceful service termination	Supported	-
5.7	Failure procedures	Supported	-
6	One time event	Supported	-
6.1	Service price enquiry	Supported	-
6.2	Balance check	Supported	-
6.3	Direct debiting	Supported	-
6.4	Refund	Supported	-
6.5	Failure procedure	Supported	-
7	Credit-Control Application state machine	Supported	-
8	Credit-Control attribute-value pairs (AVPs)	Supported	-
8.1	CC-Correlation-Id AVP	Supported	-
8.2	CC-Request-Number AVP	Supported	-
8.3	CC-Request-Type AVP	Supported	-
8.4	CC-Session-Failover AVP	Supported	-
8.5	CC-Sub-Session-Id AVP	Not supported	Not used by 3GPP
8.6	Check-Balance-Result AVP	Not supported	Not used by 3GPP
8.7	Cost-Information AVP	Supported	-
8.8	Unit-Value AVP	Supported	-
8.9	Exponent AVP	Supported	-
8.10	Value-Digits AVP	Supported	-
8.11	Currency-Code AVP	Supported	-
8.12	Cost-Unit AVP	Supported	-
8.13	Credit-Control AVP	Supported	-
8.14	Credit-Control-Failure-Handling AVP	Supported	-
8.15	Direct-Debiting-Failure-Handling AVP	Supported	-
8.16	Multiple-Services-Credit-Control AVP	Supported	-
8.17	Granted-Service-Unit AVP	Supported	-
8.18	Requested-Service-Unit AVP	Supported	-
8.19	Used-Service-Unit AVP	Supported	-
8.20	Tariff-Time-Change AVP	Supported	Supported for tariff changes during an active user session
8.21	CC-Time AVP	Supported	-
8.22	CC-Money AVP	Supported	-
8.23	CC-Total-Octets AVP	Supported	-
8.24	CC-Input-Octets AVP	Supported	-
8.25	CC-Output-Octets AVP	Supported	-
8.26	CC-Service-Specific-Units AVP	Supported	-

Table 2–1 (Cont.) Diameter Credit-Control Application Protocol Section Compliance

Section Number	Section	Status	Notes
8.27	Tariff-Change-Usage AVP	Not supported	-
8.28	Service-Identifier AVP	Supported	-
8.29	Rating-Group AVP	Supported	-
8.30	G-S-U-Pool-Reference AVP	Not supported	-
8.31	G-S-U-Pool-Identifier AVP	Not supported	-
8.32	CC-Unit-Type AVP	Not supported	-
8.33	Validity-Time AVP	Supported	Not supported for tariff changes
8.34	Final-Unit-Indication AVP	Supported	-
8.35	Final-Unit-Action AVP	Supported	-
8.36	Restriction-Filter-Rule AVP	Supported	-
8.37	Redirect-Server AVP	Supported	-
8.38	Redirect-Address-Type AVP	Supported	-
8.39	Redirect-Server-Address AVP	Supported	-
8.40	Multiple-Services-Indicator AVP	Supported	-
8.41	Requested-Action AVP	Supported	-
8.42	Service-Context-Id AVP	Supported	-
8.43	Service-Parameter-Info AVP	Not supported	Not used by 3GPP
8.44	Service-Parameter-Type AVP	Not supported	Not used by 3GPP
8.45	Service-Parameter-Value AVP	Not supported	Not used by 3GPP
8.46	Subscription-Id AVP	Supported	-
8.47	Subscription-Id-Type AVP	Supported	-
8.48	Subscription-Id-Data AVP	Supported	-
8.49	User-Equipment-Info AVP	Supported	-
8.50	User-Equipment-Info-Type AVP	Supported	-
8.50	User-Equipment-Info-Value AVP	Supported	-
9	Result code AVP values	Supported	-
9.1	Transient failures	Supported	-
9.2	Permanent failures	Supported	-

3

Diameter Gy Protocol

This chapter describes how Oracle Communications Billing and Revenue Management (BRM) Elastic Charging Engine (ECE) Diameter Gateway maps the Diameter messages for the Diameter Gy protocol defined in 3GPP TS 32.299 Version 12.0. For more information, see the 3GPP specification detail:

http://www.3gpp.org/ftp/Specs/html-info/32299.htm

Section Compliance

Table 3–1 lists the compliance information for Diameter Gy protocol sections.

Table 3–1 Diameter Gy Section Compliance

Section Number	Section	Status	Notes
1	Scope	Not applicable	-
2	References	Not applicable	-
3	Definitions, symbols and abbreviations	Not applicable	-
3.1	Definitions	Not applicable	-
3.2	Symbols	Not applicable	-
3.3	Abbreviations	Not applicable	-
4	Architecture considerations	Supported	-
4.1	High level architecture	Supported	-
4.1.0	General	Supported	-
4.1.1	Charging related transfer requirements	Supported	-
5	3GPP charging applications requirements	Supported	-
5.1	Offline charging scenarios	Supported	-
5.1.1	Basic principles	Supported	-
5.1.1.0	Introduction	Supported	-
5.1.1.1	Event based charging	Supported	-
5.1.1.2	Session based charging	Supported	-
5.1.2	Basic operation	Supported	-
5.2	Online charging scenarios	Supported	-
5.2.0	Introduction	Supported	-

Table 3–1 (Cont.) Diameter Gy Section Compliance

Section Number	Section	Status	Notes
5.2.1	Basic principles	Supported	-
5.2.2	Charging scenarios	Supported	-
5.2.2.0	Introduction	Supported	-
5.2.2.1	Immediate event charging (IEC)	Supported	-
5.2.2.1.1	Decentralized unit determination and centralized rating	Not supported	-
5.2.2.1.2	Centralized unit determination and centralized rating	Supported	-
5.2.2.1.3	Decentralized unit determination and decentralized rating	Not supported	-
5.2.2.1.4	Further options	Supported	-
5.2.2.2	Event charging with unit reservation (ECUR)	Supported	-
5.2.2.2.1	Decentralized unit determination and centralized rating	Not supported	-
5.2.2.2.2	Centralized unit determination and centralized rating	Supported	-
5.2.2.2.3	Decentralized unit determination and decentralized rating	Not supported	-
5.2.2.3	Session charging with reservation	Supported	-
5.2.2.3.1	Decentralized unit determination and centralized rating	Not supported	-
5.2.2.3.2	Centralized unit determination and centralized rating	Supported	-
5.2.2.3.3	Decentralized unit determination and decentralized rating	Not supported	-
5.2.3	Basic operations	Supported	-
5.3	Other requirements	Supported	-
5.3.1	Re-authorization	Supported	-
5.3.2	Threshold based re-authorization triggers	Supported	-
5.3.3	Termination action	Supported	-
5.3.4	Account expiration	Not supported	-
6	3GPP charging applications – protocol aspects	Supported	-
6.1	Basic principles for diameter offline charging	Supported	-
6.1.0	Introduction	Supported	-
6.1.1	Event based charging	Supported	-
6.1.2	Session based charging	Supported	-
6.1.3	Offline charging error cases - diameter procedures	Supported	-

Table 3–1 (Cont.) Diameter Gy Section Compliance

Section Number	Section	Status	Notes
6.1.3.1	Charging data function (CDF) connection failure	Supported	-
6.1.3.2	No reply from CDF	Supported	-
6.1.3.3	Duplicate detection	Supported	-
6.1.3.4	CDF detected failure	Supported	-
6.2	Message contents for offline charging	Not supported	-
6.2.1	Summary of offline charging message formats	Not supported	-
6.2.1.1	General	Not supported	-
6.2.1.2	Structure for the accounting message formats	Not supported	-
6.2.2	Accounting-Request message	Not supported	-
6.2.3	Accounting-Answer (ACA) message	Not supported	-
6.3	Basic principles for diameter online charging	Supported	-
6.3.1	Online specific Credit-Control application requirements	Supported	-
6.3.2	Diameter description on the Ro reference point	Supported	-
6.3.2.1	Basic principles	Supported	-
6.3.3	Immediate event charging (IEC)	Supported	-
6.3.4	Event charging with unit reservation (ECUR)	Supported	-
6.3.5	Session charging with unit reservation (SCUR)	Supported	-
6.3.6	Error cases and scenarios	Supported	-
6.3.6.0	Introduction	Supported	-
6.3.6.1	Duplicate detection	Supported	-
6.3.6.2	Reserve units/Debit units operation failure	Supported	-
6.3.7	Support of tariff changes during an active user session	Supported	-
6.3.7.1	Support of tariff changes using the tariff switch mechanism	Supported	-
6.3.7.2	Support of tariff changes using Validity-Time attribute-value pair (AVP)	Not supported	-
6.3.8	Support of re-authorization	Supported	-
6.3.9	Support of failure handling	Supported	-
6.3.10	Support of failover	Supported	-
6.3.11	Credit pooling	Not supported	-
6.4	Message formats for online charging	Supported	-

Table 3–1 (Cont.) Diameter Gy Section Compliance

Section Number	Section	Status	Notes
6.4.1	Summary of online charging message formats	Supported	-
6.4.1.1	General	Supported	-
6.4.1.2	Structure for the Credit-Control message formats	Supported	-
6.4.2	Credit-Control-Request message	Supported	-
6.4.3	Credit-Control-Answer message	Supported	-
6.4.4	Re-Auth-Request message	Supported	-
6.4.5	Re-Auth-Answer message	Supported	-
6.4.6	Capabilities-Exchange-Request-message	Supported	-
6.4.7	Capabilities-Exchange-Answer message	Supported	-
6.4.8	Device-Watchdog-Request message	Supported	-
6.4.9	Device-Watchdog-Answer message	Supported	-
6.4.10	Disconnect-Peer-Request message	Partially supported	-
6.4.11	Disconnect-Peer-Answer message	Partially supported	-
6.4.12	Abort-Session-Request message	Not supported	-
6.4.13	Abort-Session-Answer message	Not supported	-
6.5	Other procedural description of the 3GPP charging applications	Supported	-
6.5.1	Re-Authorization	Supported	-
6.5.1.1	Idle timeout	Supported	-
6.5.1.2	Change of charging conditions	Not supported	-
6.5.1.3	Reporting quota usage	Not supported	-
6.5.1.4	Quota consumption	Not supported	-
6.5.2	Threshold based Re-Authorization triggers	Supported	-
6.5.3	Termination action	Supported	-
6.5.4	Quota consumption time	Supported	-
6.5.5	Service termination	Not supported	-
6.5.6	Envelope reporting	Not supported	-
6.5.7	Combinational quota	Not supported	-
6.5.8	Online control of offline charging information	Supported	-
6.5.9	Support of multiple service	Supported	-
6.6	Bindings of the operation to protocol application	Supported	-
6.6.0	General	Supported	-
6.6.1	Bindings of charging data transfer to accounting	Supported	-

Table 3–1 (Cont.) Diameter Gy Section Compliance

Section Number	Section	Status	Notes
6.6.2	Bindings of debit/reserve units to Credit-Control	Supported	-
7	Summary of used attribute-value pairs (AVPs)	Not applicable	-
7.1	Diameter attribute-value pairs (AVPs)	Not applicable	-
7.1.0	General	Not applicable	-
7.1.1	Accounting-Input-Octets AVP	Not supported	-
7.1.2	Void	Not applicable	-
7.1.3	Accounting-Output-Octets AVP	Not supported	-
7.1.4	Void	Not applicable	-
7.1.5	Acct-Application-Id AVP	Supported	-
7.1.6	Auth-Application-Id AVP	Supported	-
7.1.7	Called-Station-Id AVP	Supported	-
7.1.8	Event-Timestamp AVP	Supported	-
7.1.9	Multiple-Services-Credit-Control AVP	Supported	-
7.1.10	Rating-Group AVP	Supported	-
7.1.11	Result-Code AVP	Supported	-
7.1.12	Service-Context-Id AVP	Supported	-
7.1.13	Service-Identifier AVP	Supported	-
7.1.14	Used-Service-Unit AVP	Supported	-
7.1.15	User-Name AVP	Supported	-
7.1.16	Vendor-Id AVP	Supported	-
7.1.17	User-Equipment-Info AVP	Supported	-
7.2	3GPP specific AVPs	Not supported	-
7.2.0	General	Not supported	-
7.2.1	Access-Network-Information AVP	Not supported	-
7.2.1A	Access-Transfer-Information AVP	Not supported	-
7.2.1B	Access-Transfer-Type AVP	Not supported	-
7.2.2	Account-Expiration AVP	Not supported	-
7.2.3	Accumulated-Cost AVP	Not supported	-
7.2.4	Adaptations AVP	Not supported	-
7.2.5	Additional-Content-Information AVP	Not supported	-
7.2.6	Additional-Type-Information AVP	Not supported	-
7.2.7	Address-Data AVP	Not supported	-
7.2.8	Address-Domain AVP	Not supported	-
7.2.9	Address-Type AVP	Not supported	-
7.2.10	Addressee-Type AVP	Not supported	-

Table 3–1 (Cont.) Diameter Gy Section Compliance

Section Number	Section	Status	Notes
7.2.11	AF-Correlation-Information AVP	Supported	-
7.2.12	Alternate-Charged-Party-Address AVP	Not supported	-
7.2.13	AoC-Cost-Information AVP	Not supported	-
7.2.14	AoC-Format AVP	Not supported	-
7.2.15	AoC-Information AVP	Supported	-
7.2.16	AoC-Request-Type AVP	Supported	-
7.2.17	AoC-Service AVP	Not supported	-
7.2.18	AoC-Service-Obligatory-Type AVP	Not supported	-
7.2.19	AoC-Service-Type AVP	Not supported	-
7.2.20	AoC-Subscription-Information AVP	Not supported	-
7.2.21	Applic-ID AVP	Not supported	-
7.2.22	Application-provided-Called-Party-Address AVP	Not supported	-
7.2.23	Application-Server AVP	Not supported	-
7.2.24	Application-Server-Information AVP	Not supported	-
7.2.25	Associated-Party-Address AVP	Not supported	-
7.2.26	Associated-URI AVP	Not supported	-
7.2.27	Authorised-QoS AVP	Not supported	-
7.2.28	Aux-Applic-Info AVP	Not supported	-
7.2.29	Base-Time-Interval AVP	Supported	-
7.2.29A	Basic-Service-Code AVP	Not supported	-
7.2.29B	Bearer-Capability AVP	Not supported	-
7.2.30	Bearer-Service AVP	Not supported	-
7.2.30A	Basic service set identifier (BSSID) AVP	Not supported	-
7.2.31	Called-Asserted-Identity AVP	Not supported	-
7.2.32	Called-Party-Address AVP	Not supported	-
7.2.33	Calling-Party-Address AVP	Not supported	-
7.2.34	Carrier-Select-Routing-Information AVP	Not supported	-
7.2.35	Cause-Code AVP	Not supported	-
7.2.36	CG-Address AVP	Supported	-
7.2.37	Change-Condition AVP	Supported	-
7.2.38	Change-Time AVP	Not supported	-
7.2.38A	Charge-Reason-Code AVP	Not supported	-
7.2.39	Charged-Party AVP	Not supported	-
7.2.39A	Charging-Characteristics-Selection-Mode AVP	Not supported	-
7.2.40	Class-Identifier AVP	Not supported	-

Table 3–1 (Cont.) Diameter Gy Section Compliance

Section Number	Section	Status	Notes
7.2.41	Client-Address AVP	Not supported	-
7.2.41A	CN-Operator-Selection-Entity AVP	Not supported	-
7.2.42	Content-Class AVP	Not supported	-
7.2.43	Content-Disposition AVP	Not supported	-
7.2.44	Content-Length AVP	Not supported	-
7.2.45	Content-Size AVP	Not supported	-
7.2.46	Content-Type AVP	Not supported	-
7.2.46A	CSG-Access-Mode AVP	Supported	-
7.2.46B	CSG-Membership-Indication AVP	Supported	-
7.2.47	Current-Tariff AVP	Not supported	-
7.2.48	CUG-Information AVP	Not supported	-
7.2.49	Data-Coding-Scheme AVP	Not supported	-
7.2.50	DCD-Information AVP	Supported	-
7.2.51	Deferred-Location-Event-Type AVP	Not supported	-
7.2.52	Delivery-Report-Requested AVP	Not supported	-
7.2.53	Destination-Interface AVP	Not supported	-
7.2.54	Diagnostics AVP	Supported	-
7.2.55	Domain-Name AVP	Not supported	-
7.2.56	DRM-Content AVP	Not supported	-
7.2.57	Dynamic-Address-Flag AVP	Supported	-
7.2.57A	Dynamic-Address-Flag-Extension AVP	Not supported	-
7.2.58	Early-Media-Description AVP	Not supported	-
7.2.59	Envelope AVP	Supported	-
7.2.60	Envelope-End-Time AVP	Supported	-
7.2.61	Envelope-Reporting AVP	Supported	-
7.2.62	Envelope-Start-Time AVP	Supported	-
7.2.62A	ePDG-Address AVP	Not supported	-
7.2.63	Event AVP	Not supported	-
7.2.64	Event-Charging-TimeStamp AVP	Supported	-
7.2.65	Event-Type AVP	Not supported	-
7.2.66	Expires AVP	Not supported	-
7.2.67	File-Repair-Supported AVP	Not supported	-
7.2.67A	Forwarding-Pending AVP	Not supported	-
7.2.67B	From-Address AVP	Not supported	-
7.2.68	GGSN-Address AVP	Supported	-
7.2.69	IM-Information AVP	Supported	-

Table 3–1 (Cont.) Diameter Gy Section Compliance

Section Number	Section	Status	Notes
7.2.70	Incremental-Cost AVP	Not supported	-
7.2.70A	Instance-Id AVP	Not supported	-
7.2.71	Interface-Id AVP	Not supported	-
7.2.72	Interface-Port AVP	Not supported	-
7.2.73	Interface-Text AVP	Not supported	-
7.2.74	Interface-Type AVP	Not supported	-
7.2.74A	IMS-Application-Reference-Identifier AVP	Not supported	-
7.2.75	IMS-Charging-Identifier AVP	Not supported	-
7.2.76	IMS-Communication-Service-Identifier AVP	Not supported	-
7.2.76A	IMS-Emergency-Indicator AVP	Not supported	-
7.2.77	IMS-Information AVP	Supported	-
7.2.77A	IMS-Visited-Network-Identifier AVP	Not supported	-
7.2.78	IMSI-Unauthenticated-Flag AVP	Not supported	-
7.2.79	Incoming-Trunk-Group-ID AVP	Not supported	-
7.2.79A	Initial-IMS-Charging-Identifier AVP	Not supported	-
7.2.80	Inter-Operator-Identifier AVP	Not supported	-
7.2.80A	IP-Realm-Default-Indication AVP	Not supported	-
7.2.80B	ISUP-Cause AVP	Not supported	-
7.2.80C	ISUP-Cause-Diagnostics AVP	Not supported	-
7.2.80D	ISUP-Cause-Location AVP	Not supported	-
7.2.80E	ISUP-Cause-Value AVP	Not supported	-
7.2.80F	ISUP-Location-Number AVP	Not supported	-
7.2.81	LCS-APN AVP	Not supported	-
7.2.82	LCS-Client-Dialed-By-MS AVP	Not supported	-
7.2.83	LCS-Client-External-ID AVP	Not supported	-
7.2.84	LCS-Client-ID AVP	Not supported	-
7.2.85	LCS-Client-Name AVP	Not supported	-
7.2.86	LCS-Client-Type AVP	Not supported	-
7.2.87	LCS-Data-Coding-Scheme AVP	Not supported	-
7.2.88	LCS-Format-Indicator AVP	Not supported	-
7.2.89	LCS-Information AVP	Supported	-
7.2.90	LCS-Name-String AVP	Not supported	-
7.2.91	LCS-Requestor-ID AVP	Not supported	-
7.2.92	LCS-Requestor-ID-String AVP	Not supported	-
7.2.92A	Local-GW-Inserted-Indication AVP	Not supported	-

Table 3–1 (Cont.) Diameter Gy Section Compliance

Section Number	Section	Status	Notes
7.2.93	Local-Sequence-Number AVP	Not supported	-
7.2.94	Location-Estimate AVP	Not supported	-
7.2.95	Location-Estimate-Type AVP	Not supported	-
7.2.96	Location-Type AVP	Not supported	-
7.2.97	Low-Balance-Indication AVP	Supported	-
7.2.97A	Low-Priority-Indicator AVP	Not supported	-
7.2.97B	MBMS-Charged-Party AVP	Not supported	-
7.2.98	MBMS-GW-Address AVP	Not supported	-
7.2.99	MBMS-Information AVP	Supported	-
7.2.100	MBMS-User-Service-Type AVP	Not supported	-
7.2.101	Media-Initiator-Flag AVP	Not supported	-
7.2.102	Media-Initiator-Party AVP	Not supported	-
7.2.103	Message-Body AVP	Not supported	-
7.2.104	Message-Class AVP	Not supported	-
7.2.105	Message-ID AVP	Not supported	-
7.2.106	Message-Size AVP	Not supported	-
7.2.107	Message-Type AVP	Not supported	-
7.2.108	MM-Content-Type AVP	Not supported	-
7.2.109	MMBox-Storage-Requested AVP	Not supported	-
7.2.110	MMS-Information AVP	Supported	-
7.2.111	MMTel-Information AVP	Supported	-
7.2.111A	MMTel-Service-Type AVP	Not supported	-
7.2.111B	MSC-Address AVP	Not supported	-
7.2.111C	MTC-IWF-Address AVP	Not supported	-
7.2.111D	Neighbour-Node-Address AVP	Not supported	-
7.2.112	Next-Tariff AVP	Not supported	-
7.2.112A	NNI-Information AVP	Not supported	-
7.2.112B	NNI-Type AVP	Not supported	-
7.2.113	Node-Functionality AVP	Not supported	-
7.2.114	Node-Id AVP	Supported	-
7.2.115	Number-Of-Diversions AVP	Not supported	-
7.2.116	Number-Of-Messages-Sent AVP	Not supported	-
7.2.117	Number-Of-Participants AVP	Not supported	-
7.2.118	Number-Of-Received-Talk-Bursts AVP	Not supported	-
7.2.119	Number-Of-Talk-Bursts AVP	Not supported	-
7.2.120	Number-Portability-Routing-Information AVP	Not supported	-

Table 3–1 (Cont.) Diameter Gy Section Compliance

Section Number	Section	Status	Notes
7.2.121	Offline-Charging AVP	Supported	-
7.2.122	Online-Charging-Flag AVP	Not supported	-
7.2.123	Originating-IOI AVP	Not supported	-
7.2.124	Originator AVP	Not supported	-
7.2.125	Originator-Address AVP	Not supported	-
7.2.126	Originator-Interface AVP	Not supported	-
7.2.127	Originator-Received-Address AVP	Not supported	-
7.2.128	Originator-SCCP-Address	Not supported	-
7.2.128A	Outgoing-Session-Id AVP	Not supported	-
7.2.129	Outgoing-Trunk-Group-ID AVP	Not supported	-
7.2.185	SDP-TimeStamps AVP	Not supported	-
7.2.186	SDP-Type AVP	Not supported	-
7.2.186A	Session-Direction AVP	Not supported	-
7.2.187	Served-Party-IP-Address AVP	Not supported	-
7.2.188	Void	Not applicable	-
7.2.189	Service-Data-Container AVP	Supported	-
7.2.190	Service-ID AVP	Not supported	-
7.2.191	Service-Generic-Information AVP	Supported	-
7.2.192	Service-Information AVP	Supported	-
7.2.193	Service-Mode AVP	Not supported	-
7.2.194	Service-Specific-Data AVP	Not supported	-
7.2.195	Service-Specific-Info AVP	Supported	-
7.2.196	Service-Specific-Type AVP	Not supported	-
7.2.197	Void	Not applicable	-
7.2.198	Serving-Node-Type AVP	Supported	-
7.2.199	SGSN-Address AVP	Supported	-
7.2.199A	SGW-Address AVP	Not applicable	-
7.2.200	SGW-Change AVP	Supported	-
7.2.201	SIP-Method AVP	Not supported	-
7.2.202	SIP-Request-Timestamp AVP	Not supported	-
7.2.203	SIP-Request-Timestamp-Fraction AVP	Not supported	-
7.2.204	SIP-Response-Timestamp AVP	Not supported	-
7.2.205	SIP-Response-Timestamp-Fraction AVP	Not supported	-
7.2.205A	SM-Device-Trigger-Indicator AVP	Not supported	-
7.2.205B	SM-Device-Trigger-Information AVP	Not supported	-
7.2.206	SM-Discharge-Time AVP	Not supported	-

Table 3–1 (Cont.) Diameter Gy Section Compliance

Section Number	Section	Status	Notes
7.2.207	SM-Message-Type AVP	Not supported	-
7.2.208	SM-Protocol-Id AVP	Not supported	-
7.2.208A	SM-Sequence-Number AVP	Not supported	-
7.2.209	SM-Status AVP	Not supported	-
7.2.210	SM-User-Data-Header AVP	Not supported	-
7.2.211	SMS-Information AVP	Supported	-
7.2.212	SMS-Node AVP	Not supported	-
7.2.212A	SMS-Result AVP	Not supported	-
7.2.213	SM-Service-Type AVP	Not supported	-
7.2.214	SMSC-Address AVP	Not supported	-
7.2.214A	Start-of-Charging AVP	Not supported	-
7.2.215	Start-Time AVP	Supported	-
7.2.215A	Status-Code AVP	Not supported	-
7.2.216	Stop-Time AVP	Supported	-
7.2.217	Submission-Time AVP	Not supported	-
7.2.218	Subscriber-Role AVP	Not supported	-
7.2.219	Supplementary-Service AVP	Not supported	-
7.2.219A	TAD-Identifier AVP	Not supported	-
7.2.220	Talk-Burst-Exchange AVP	Not supported	-
7.2.221	Talk-Burst-Time AVP	Not supported	-
7.2.222	Talk-Burst-Volume AVP	Not supported	-
7.2.223	Tariff-Information AVP	Not supported	-
7.2.224	Tariff-XML AVP	Not supported	-
7.2.224A	Teleservice AVP	Not supported	-
7.2.225	Terminating-IOI AVP	Not supported	-
7.2.226	Time-First-Usage AVP	Not supported	-
7.2.227	Time-Last-Usage AVP	Not supported	-
7.2.228	Time-Quota-Mechanism	Supported	-
7.2.229	Time-Quota-Threshold AVP	Supported	-
7.2.230	Time-Quota-Type AVP	Supported	-
7.2.231	Time-Stamps AVP	Not supported	-
7.2.232	Time-Usage AVP	Not supported	-
7.2.233	Traffic-Data-Volumes AVP	Supported	-
7.2.233A	Transcoder-Inserted-Indication AVP	Not supported	-
7.2.233B	Transit-IOI-List AVP	Not supported	-
7.2.234	Token-Text AVP	Not supported	-

Table 3–1 (Cont.) Diameter Gy Section Compliance

Section Number	Section	Status	Notes
7.2.235	Trigger AVP	Supported	-
7.2.236	Trigger-Type AVP	Supported	-
7.2.237	Trunk-Group-ID AVP	Not supported	-
7.2.237A	Void	Not applicable	-
7.2.237B	Void	Not applicable	-
7.2.237C	TWAN-User-Location-Info AVP	Not supported	-
7.2.238	Type-Number AVP	Not supported	-
7.2.239	Unit-Cost AVP	Not supported	-
7.2.240	Unit-Quota-Threshold AVP	Supported	-
7.2.240A	User-CSG-Information AVP	Not supported	-
7.2.241	User-Participating-Type AVP	Not supported	-
7.2.242	User-Session-Id AVP	Not supported	-
7.2.242A	VCS-Information AVP	Not supported	-
7.2.242B	VLR-Number AVP	Not supported	-
7.2.243	Volume-Quota-Threshold AVP	Supported	-
7.2.244	Void	Not applicable	-
7.2.245	Void	Not applicable	-
7.2.246	Void	Not applicable	-
7.2.247	Void	Not applicable	-
7.2.248	Void	Not applicable	-
7.2.249	Void	Not applicable	-
7.2.250	Void	Not applicable	-
7.3	3GPP2 access specific AVPs	Not applicable	-
7.4	Fixed access specific AVPs	Not applicable	-

Diameter Session Commands

Table 3–2 lists the Diameter session commands supported by Diameter Gateway.

Table 3–2 Diameter Session Commands

Diameter Command	Status	Notes
Credit-Control-Request (CCR)	Supported	-
Credit-Control-Answer (CCA)	Supported	-

Diameter Credit-Control Request Messages

Table 3–3 lists the Diameter credit-control request messages supported by Diameter Gateway.

Table 3–3 Diameter Credit-Control Request Messages

Diameter Gy Message	Status	Notes
Session Charging	Supported	-
Top-Up	Supported	-
Balance-Query	Supported	Supports both summary and detailed Balance-Query modes
Debit/Refund	Supported	-
Price Enquiry	Supported	-

Gy Session Charging (IUT) Request AVPs

Table 3–4 lists the compliance information for Gy Session Charging attribute-value pairs (AVPs) for the session-based request operations, such as INITIATE, UPDATE, and TERMINATE (IUT).

Table 3–4 Gy Session Charging (IUT) Request AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
Service-Context-Id	Supported	-
CC-Request-Type	Supported	1 - INITIATE 2 - UPDATE 3 - TERMINATE
CC-Request-Number	Supported	-
Event-Timestamp	Supported	-
Subscription-Id	Supported	-
-- Subscription-Id-Data	Supported	-
--Subscription-Id-Type	Supported	-
Termination-Cause	Supported	-
Service-Information	Supported	-
-- PS-Information	Supported	-
-- -- Called-Station-Id	Supported	-
-- -- SGSN-Address	Supported	-
-- -- GGSN-Address	Supported	-
-- -- MS-TimeZone-3GPP	Supported	-
-- -- Diagnostics	Supported	-
User-Name	Not supported	Subscription-Id-Data AVP is used instead
Multiple-Services-Credit-Control	Supported	See Table 3–5 for more information.

Multiple-Services-Credit-Control

Table 3–5 lists the compliance information for Multiple-Services-Credit-Control AVPs for the Gy Session Charging request operations.

Table 3–5 Multiple-Services-Credit-Control AVPs for Gy Session Charging Request

Diameter AVP	Status	Notes
Service-Identifier	Supported	-
Rating-Group	Supported	-
Requested-Service-Unit	Supported	-
-- CC-Time	Supported	-
-- CC-Money	Not supported	-
-- CC-Total-Octets	Supported	-
-- CC-Input-Octets	Supported	-
-- CC-Output-Octets	Supported	-
-- CC-Service-Specific-Units	Supported	-
Used-Service-Unit	Supported	-
-- CC-Time	Supported	-
-- CC-Money	Not supported	-
-- CC-Total-Octets	Supported	-
-- CC-Input-Octets	Supported	-
-- CC-Output-Octets	Supported	-
-- CC-Service-Specific-Units	Supported	-

Gy Session Charging (IUT) Response AVPs

Table 3–6 lists the compliance information for Diameter Credit-Control-Answer AVPs for the Gy Session Charging response operations.

Table 3–6 Gy Session Charging (IUT) Response AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
Result-Code	Supported	-
CC-Request-Type	Supported	-
CC-Session-Failover	Supported	-
Credit-Control-Failure-Handling	Supported	-
Multiple-Services-Credit-Control	Supported	See Table 3–7

Multiple-Services-Credit-Control

Table 3–7 lists the Multiple-Services-Credit-Control AVPs for the Gy Session Charging response operations.

Table 3–7 Multiple-Services-Credit-Control AVPs for Gy Session Charging Response

Diameter AVP	Status	Notes
Requested-Service-Unit	Supported	Contains the AVPs submitted in the message request.
Granted-Service-Unit	Supported	-
-- CC-Time	Supported	-
-- CC-Money	Not supported	-
-- CC-Total-Octets	Supported	-
-- CC-Input-Octets	Supported	-
-- CC-Output-Octets	Supported	-
-- CC-Service-Specific-Units	Supported	-
-- Cost-Information	Supported	-
-- -- Unit-Value	Supported	-
-- -- -- Value-Digits	Supported	-
-- -- -- Exponent	Supported	-
-- -- Currency-Code	Supported	-
ORA-Customer-Cost-Information	Supported	-
-- ORA-Subscriber-Id	Supported	-
-- ORA-Cost-Information	Supported	-
-- -- Unit-Value	Supported	-
-- -- -- Value-Digits	Supported	-
-- -- -- Exponent	Supported	-
-- -- ORA-Balance-Element-Id	Supported	-
ORA-Remaining-Balance	Supported	-
-- ORA-Balance-Element	Supported	-
-- -- ORA-Balance-Element-Id	Supported	-
-- -- Unit-Value	Supported	-
-- -- -- Value-Digits	Supported	-
-- -- -- Exponent	Supported	-
-- -- ORA-Balance-Item	Supported	-
-- ORA-Subscriber-Id	Supported	-
ORA-Credit-Threshold-Breach	Supported	-
-- ORA-Balance-Element-Id	Supported	-
-- ORA-Current-Balance	Supported	-
-- ORA-Fixed-Threshold-Values	Supported	-
-- -- ORA-Fixed-Threshold	Supported	-
-- ORA-Percentage-Threshold-Values	Supported	-
-- -- ORA-Percentage-Threshold	Supported	-

Table 3–7 (Cont.) Multiple-Services-Credit-Control AVPs for Gy Session Charging Response

Diameter AVP	Status	Notes
-- ORA-Breach-Direction	Supported	0 - THRESHOLD _BREACH_UP 1 - THRESHOLD_BREACH_DOWN
Final-Unit-Indication	Partially supported	TERMINATE and REDIRECT are supported.
Validity-Time	Supported	-
Result-Code	Supported	-

Gy Top-Up Request AVPs

Table 3–8 lists the compliance information for Gy Top-Up AVPs for the request operations.

Table 3–8 Gy Top-Up Request AVPs

Diameter AVP	Status	Notes
CC-Request-Type	Supported	4 - EVENT_REQUEST
Requested-Action	Supported	4 - TOP-UP
Subscription-Id	Supported	-
-- Subscription-Id-Type	Supported	-
-- Subscription-Id-Data	Supported	-
Event-Timestamp	Supported	-
Rating-Group	Supported	-
Service-Identifier	Supported	-
ORA-Account-Topup	Supported	-
-- ORA-Recharge-Reference	Supported	-
-- ORA-Balance	Supported	-
-- -- ORA-Balance-Element-Id	Supported	-
-- -- Unit-Value	Supported	-
-- -- -- Value-Digits	Supported	-
-- -- -- Exponent	Supported	-
-- -- ORA-Validity-Start-Time	Supported	-
-- -- ORA-Validity-End-Time	Supported	-
-- -- ORA-Validity-Start-Relative	Supported	-
-- -- -- ORA-Validity-Offset	Supported	-

Table 3–8 (Cont.) Gy Top-Up Request AVPs

Diameter AVP	Status	Notes
-- -- -- ORA-Validity-Unit	Supported	0 - SECONDS 1- MINUTES 2 - HOURS 3 - DAYS 4 - MONTHS 5 - ACC_CYCLE 6 - BILL_CYCLE 7 - ABSOLUTE 8 - INFINITE
-- -- ORA-Validity-End-Relative	Supported	-
-- -- -- ORA-Validity-Offset	Supported	-
-- -- -- ORA-Validity-Unit	Supported	0 - SECONDS 1- MINUTES 2 - HOURS 3 - DAYS 4 - MONTHS 5 - ACC_CYCLE 6 - BILL_CYCLE 7 - ABSOLUTE 8 - INFINITE
-- -- ORA-First-Usage-Validity	Supported	-
-- -- -- ORA-Validity-Offset	Supported	-
-- -- -- ORA-Validity-Unit	Supported	0 - SECONDS 1- MINUTES 2 - HOURS 3 - DAYS 4 - MONTHS 5 - ACC_CYCLE 6 - BILL_CYCLE 7 - ABSOLUTE 8 - INFINITE
-- -- ORA-Extend-Bucket-Validity	Supported	0 - FALSE 1 - TRUE
-- -- Service-Identifier	Supported	-
-- -- Rating-Group	Supported	-
Multi-Services-Indicator	Not supported	Does not apply

Gy Top-Up Response AVPs

Table 3–9 lists the compliance information for Gy Top-Up AVPs for the response operations.

Table 3–9 Gy Top-Up Response AVPs

Diameter AVP	Status	Notes
ORA-Remaining-Balance	Supported	-
-- ORA-Balance-Element	Supported	-
-- ORA-Applicable-Services	Supported	-
-- -- Service-Identifier	Supported	-
-- -- Rating-Group	Supported	-
-- ORA-Balance-Element	Supported	-
-- -- Unit-Value	Supported	-
-- -- -- Value-Digits	Supported	-
-- -- -- Exponent	Supported	-
-- -- ORA-Balance-Item	Supported	-
-- -- -- Unit-Value	Supported	-
-- -- -- -- Value-Digits	Supported	-
-- -- -- -- Exponent	Supported	-
-- -- -- ORA-Validity-Start-Time	Supported	-
-- -- -- ORA-Validity-End-Time	Supported	-
-- -- ORA-Earliest-Expiry-Time	Supported	-
CC-Session-Failover	Supported	-
Credit-Control-Failure-Handling	Supported	-

Gy Balance Query Request AVPs

Table 3–10 lists the compliance information for Gy Balance Query AVPs for the request operations.

Table 3–10 Gy Balance Query Request AVPs

Diameter AVP	Status	Notes
CC-Request-Type	Supported	4 - EVENT_REQUEST
Requested-Action	Supported	5 - BALANCE_QUERY
Event-Timestamp	Supported	-
Subscription-Id	Supported	-
-- Subscription-Id-Data	Supported	-
-- Subscription-Id-Type	Supported	-
Service-Identifier	Supported	-
Rating Group	Supported	-
ORA-Balance-Query-Mode	Supported	1- Summary 2 - Detailed
Multi-Services-Indicator	Not supported	Does not apply

Gy Balance Query Response AVPs

Table 3–11 lists the compliance information for Gy Balance Query AVPs for the response operations.

Table 3–11 Gy Balance Query Response AVPs

Diameter AVP	Status	Notes
Service-Identifier	Supported	Returned only when it is set in the original request; indicates the corresponding product for which the Balance query is returned.
Rating-Group	Supported	Returned only when it is set in the original request; indicates the corresponding product for which the Balance query is returned.
ORA-Balance-Details	Supported	-
-- ORA-Balance-Element	Supported	-
-- -- ORA-Balance-Element-Id	Supported	-
-- -- Unit-Value	Supported	-
-- -- -- Value-Digits	Supported	-
-- -- -- Exponent	Supported	-
-- -- ORA-Earliest-Expiry-Time	Supported	-
-- -- ORA-Balance-Item	Supported	-
-- -- -- Unit-Value	Supported	-
-- -- -- -- Value-Digits	Supported	-
-- -- -- -- Exponent	Supported	-
-- -- -- ORA-Validity-Start-Time	Supported	-
-- -- -- ORA-Validity-End-Time	Supported	-
-- -- -- ORA-Consumed-Reservation-Amount	Supported	-
-- -- -- -- Value-Digits	Supported	-
-- -- -- -- Exponent	Supported	-
-- -- -- ORA-Active-Reservation-Amount	Supported	-
-- -- -- -- Value-Digits	Supported	-
-- -- -- -- Exponent	Supported	-
-- -- ORA-Credit-Floor	Supported	-
-- -- -- Value-Digits	Supported	-
-- -- -- Exponent	Supported	-
-- -- ORA-Credit-Ceiling	Supported	-
-- -- -- Value-Digits	Supported	-
-- -- -- Exponent	Supported	-
-- -- ORA-Percent-Credit-Threshold	Supported	-
-- -- -- ORA-Threshold-Value	Supported	-
-- -- ORA-Fixed-Credit-Threshold	Supported	-

Table 3–11 (Cont.) Gy Balance Query Response AVPs

Diameter AVP	Status	Notes
-- -- -- ORA-Threshold-Value	Supported	-
CC-Session-Failover	Supported	-
Credit-Control-Failure-Handling	Supported	-

Gy Debit/Refund Request AVPs

Table 3–12 lists the compliance information for Gy Debit/Refund AVPs for the request operations.

Table 3–12 Gy Debit/Refund Request AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
Service-Context-Id	Supported	-
CC-Request-Type	Supported	-
CC-Request-Number	Supported	-
Refund-Information	Supported	-
CC-Correlation-Id	Supported	-
Destination-Host	Not supported	-
User-Name	Not supported	Subscription-Id-Data AVP is used instead
CC-Sub-Session-Id	Not supported	-
Acct-Multi-Session-Id	Not supported	-
Origin-State-Id	Not supported	-
Event-Timestamp	Supported	-
Subscription-Id	Supported	-
-- Subscription-Id-Data	Supported	-
-- Subscription-Id-Type	Supported	-
Requested-Action	Supported	0 - DIRECT_DEBITING 1 - REFUND_ACCOUNT. For more information, see: https://tools.ietf.org/html/rfc4006#section-8.41
Multiple-Services-Indicator	Supported	Always expected to be True
Service-Parameter-Info	Not supported	-
User-Equipment-Info	Not supported	-
Proxy-Info	Not supported	-

Table 3–12 (Cont.) Gy Debit/Refund Request AVPs

Diameter AVP	Status	Notes
Route-Record	Not supported	-
Service-Information	Supported	-
-- PS-Information	Supported	-
-- -- Called-Station-Id	Supported	-
-- -- MS-TimeZone-3GPP	Supported	-
Multiple-Services-Credit-Control	Supported	See Table 3–13

Multiple-Services-Credit-Control

Table 3–13 lists compliance information for Multiple-Services-Credit-Control AVPs for Gy Debit/Refund request operations.

Table 3–13 Multiple-Services-Credit-Control AVPs for Gy Debit/Refund Request

Diameter AVP	Status	Notes
Service-Identifier	Supported	-
Rating-Group	Supported	-
Requested-Service-Unit	Supported	-
-- CC-Time	Supported	-
-- CC-Money	Supported	-
-- -- Unit-Value		-
-- -- -- Value-Digits		-
-- -- -- Exponent	Supported	-
-- -- Currency-Code	Supported	-
-- CC-ORA-Balance-Element.	Supported	-
-- -- Unit-Value		-
-- -- -- Value-Digits		-
-- -- -- Exponent	Supported	-
-- -- ORA-Balance-Element-Id	Supported	-
-- CC-Total-Octets	Supported	-
-- CC-Input-Octets	Supported	-
-- CC-Output-Octets	Supported	-
-- CC-Service-Specific-Units	Supported	-

Gy Debit/Refund Response AVPs

Table 3–14 lists the compliance information for Gy Debit/Refund AVPs for the response operations.

Table 3–14 Gy Debit/Refund Response AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
Result-Code	Supported	-
Remaining-Balance	Supported	-
Cost-Information	Supported	-
ORA-Customer-Cost-Information	Supported	-
CC-Session-Failover	Supported	-
Credit-Control-Failure-Handling	Supported	-
Direct-Debiting-Failure-Handling	Supported	-
Multiple-Services-Credit-Control	Supported	See Table 3–15

Multiple-Services-Credit-Control

Table 3–15 lists the compliance information for Multiple-Services-Credit-Control AVPs for Gy Debit/Refund response operations.

Table 3–15 Multiple-Services-Credit-Control AVPs for Gy Debit/Refund Response

Diameter AVP	Status	Notes
Result-Code	Supported	-
Service-Identifier	Supported	-
Rating-Group	Supported	-
Refund-Information	Supported	Only for refund
Granted-Service-Units	Supported	Supplied only in a debit response
-- CC-Time	Supported	-
-- CC-Money	Supported	-
-- -- Unit-Value	Supported	-
-- -- -- Value-Digits	Supported	-
-- -- -- Exponent	Supported	-
-- -- Currency-Code	Supported	-
-- CC-ORA-Balance-Element	Supported	-
-- -- Unit-Value	Supported	-
-- -- -- Value-Digits	Supported	-
-- -- -- Exponent	Supported	-
-- -- ORA-Balance-Element-Id	Supported	-
Requested-Service-Unit	Supported	Contains the AVPs submitted in the message request.
-- CC-Total-Octets	Supported	-
-- CC-Input-Octets	Supported	-
-- CC-Output-Octets	Supported	-
-- CC-Service-Specific-Units	Supported	-
ORA-Customer-Cost-Information	Supported	-

Table 3–15 (Cont.) Multiple-Services-Credit-Control AVPs for Gy Debit/Refund Response

Diameter AVP	Status	Notes
-- ORA-Subscriber-Id	Supported	-
-- ORA-Cost-Information	Supported	-
-- -- Unit-Value	Supported	-
-- -- -- Value-Digits	Supported	-
-- -- -- Exponent	Supported	-
-- -- ORA-Balance-Element-Id	Supported	-
ORA-Remaining-Balance	Supported	-
-- ORA-Subscriber-Id	Supported	-
-- ORA-Balance-Element	Supported	-
-- -- ORA-Balance-Element-Id	Supported	-
-- -- Unit-Value	Supported	-
-- -- -- Value-Digits	Supported	-
-- -- -- Exponent	Supported	-

Gy Price Enquiry Request AVPs

Table 3–16 lists the compliance information for Gy Price Enquiry AVPs for the request operations.

Table 3–16 Gy Price Enquiry Request AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
Service-Context-Id	Supported	-
CC-Request-Type	Supported	-
CC-Request-Number	Supported	-
Destination-Host	Not supported	-
User-Name	Not supported	Subscription-Id-Data AVP is used instead.
CC-Sub-Session-Id	Not supported	-
Acct-Multi-Session-Id	Not supported	-
Origin-State-Id	Not supported	-
Event-Timestamp	Supported	-
Subscription-Id	Supported	-
-- Subscription-Id-Data	Supported	-
-- Subscription-Id-Type	Supported	-
Requested-Action	Supported	3 - PRICE_ENQUIRY
Multiple-Services-Indicator	Supported	Always expected to be True

Table 3–16 (Cont.) Gy Price Enquiry Request AVPs

Diameter AVP	Status	Notes
Service-Information	Supported	-
-- PS-Information	Supported	-
-- -- Called-Station-Id	Supported	-
-- -- SGSN-Address	Supported	-
-- -- GGSN-Address	Supported	-
-- -- MS-TimeZone-3GPP	Supported	-
-- -- Diagnostics	Supported	-
Service-Parameter-Info	Not supported	-
CC-Correlation-Id	Not supported	-
User-Equipment-Info	Not supported	-
Proxy-Info	Not supported	-
Multiple-Services-Credit-Control	Supported	See Table 3–17

Multiple-Services-Credit-Control

Table 3–17 lists the compliance information for Multiple-Services-Credit-Control AVPs for Gy price enquiry request operations.

Table 3–17 Multiple-Services-Credit-Control AVPs for Gy Price Enquiry Request

Diameter AVP	Status	Notes
Multiple-Services-Credit-Control	Supported	-
-- Service-Identifier	Supported	-
-- Rating-Group	Supported	-
-- Requested-Service-Unit	Supported	-
-- -- CC-Time	Supported	-
-- -- CC-Input-Octets	Supported	-
-- -- CC-Output-Octets	Supported	-
-- -- CC-Total-Octets	Supported	-

Gy Price Enquiry Response AVPs

Table 3–18 lists the compliance information for Gy Price Enquiry AVPs for the response operations.

Table 3–18 Gy Price Enquiry Response AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
Result-Code	Supported	-
Multiple-Services-Credit-Control	Supported	See Table 3–19

Table 3–18 (Cont.) Gy Price Enquiry Response AVPs

Diameter AVP	Status	Notes
Cost-Information	Supported	-
-- Unit-Value	Supported	-
-- -- Value-Digits	Supported	-
-- -- Exponent	Supported	-
-- Currency-Code	Supported	-
CC-Session-Failover	Supported	-
Credit-Control-Failure-Handling	Supported	-

Multiple-Services-Credit-Control

Table 3–19 lists the compliance information for Multiple-Services-Credit-Control AVPs for Gy Price Enquiry response operations.

Table 3–19 Multiple-Services-Credit-Control AVPs for Gy Price Enquiry Response

Diameter AVP	Status	Notes
-- Service-Identifier	Supported	-
-- Rating-Group	Supported	-
-- Requested-Service-Unit	Supported	-
-- -- CC-Time	Supported	-
-- -- CC-Input-Octets	Supported	-
-- -- CC-Output-Octets	Supported	-
-- -- CC-Total-Octets	Supported	-
-- ORA-Customer-Cost-Information	Supported	-
-- -- ORA-Subscriber-Id	Supported	-
-- -- ORA-Cost-Information	Supported	-
-- -- -- Unit-Value	Supported	-
-- -- -- -- Value-Digits	Supported	-
-- -- -- -- Exponent	Supported	-
-- -- -- ORA-Balance-Element-Id	Supported	-

Diameter Session Reauthorization Commands

Table 3–20 lists the compliance information for Diameter Session Reauthorization commands.

Table 3–20 Diameter Session Reauthorization Commands

Diameter Command	Status	Notes
Re-Auth-Request (RAR)	Supported	-
Re-Auth--Answer (RAA)	Supported	-

Re-Auth-Request AVPs

Table 3–21 lists the compliance information for Re-Auth-Request (RAR) AVPs.

Table 3–21 Re-Auth-Request AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
Origin-Host	Supported	-
Origin-Realm	Supported	-
Destination-Host	Supported	-
Destination-Realm	Supported	-
Origin-State-Id	Supported	-
Service-Identifier	Supported	-
Rating-Group	Supported	-

Re-Auth-Answer AVPs

Table 3–22 lists the compliance information for Re-Auth-Answer (RAA) AVPs.

Table 3–22 Re-Auth-Answer AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
Origin-Host	Supported	-
Origin-Realm	Supported	-
Result-Code	Supported	-

Diameter Session Termination Commands

Table 3–23 lists the compliance information for Diameter Session Termination commands.

Table 3–23 Diameter Session Termination Commands

Diameter Command	Status	Notes
Session-Termination-Request (STR)	Supported	-
Session-Termination-Answer (STA)	Supported	-

Session-Termination-Request AVPs

Table 3–24 lists the compliance information for Session-Termination-Request (STR) AVPs.

Table 3–24 Session-Termination-Request AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-

Session-Termination-Answer AVPs

Table 3–25 lists the compliance information for Session-Termination-Answer (STA) AVPs.

Table 3–25 Session-Termination-Answer AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
Result-Code	Supported	-
Failed-AVP	Supported	-

4

Diameter Sy Protocol

This chapter describes how Oracle Communications Billing and Revenue Management (BRM) Elastic Charging Engine (ECE) Diameter Gateway maps the Diameter messages for Diameter Sy Protocol defined in 3GPP TS 29.219 Version 12.0. For more information, see the 3GPP Specification detail:

http://www.3gpp.org/ftp/Specs/html-info/29219.htm

Section Compliance

Table 4–1 lists the compliance information for Diameter Sy protocol sections.

Table 4–1 Diameter Sy Section Compliance

Section Number	Section	Status	Notes
1	Scope	No requirement	-
2	References	No requirement	-
3	Definitions, symbols, and abbreviations	No requirement	-
3.1	Definitions	No requirement	-
3.2	Symbols	No requirement	-
3.3	Abbreviations	No requirement	-
4	Sy reference point	No requirement	-
4.1	Overview	No requirement	-
4.2	Sy reference model	Supported	-
4.3	Subscriber spending limits	Supported	Diameter Gateway supports pending policy counters.
4.4	Functional elements	Supported	-
4.4.1	PCRF	Not applicable	Section applies to policy and charging rules function (PCRF).
4.4.2	OCS	Supported	-
4.5	Spending limits procedures over Sy reference point	No requirement	-
4.5.1	Initial/Intermediate spending limit report request	No requirement	-
4.5.1.1	General	Supported	-

Table 4–1 (Cont.) Diameter Sy Section Compliance

Section Number	Section	Status	Notes
4.5.1.2	Detailed behavior of the PCRF	Not applicable	Section applies to PCRF.
4.5.1.3	The behavior of the OCS	Partially supported	The Online Charging System (OCS) will always return the DIAMETER_ERROR_ UNKNOWN POLICY_ COUNTERS error whenever a policy counter is requested that is either unknown or not applicable to the subscriber. This behavior is not configurable. Pending policy counters will always be provided if they are present in the OCS data. When the **syRejectNoCounters** attribute is set to **false** or not set, OCS will not return the DIAMETER_ERROR_NO_ AVAILABLE_POLICY_ COUNTERS error. Instead, it will generate the Spending-Limit-Answer (SLA) success notification with no policy counters and subscribe to the Sy session to receive updates on any future policy counter changes.
4.5.2	Spending limit report	No requirement	-
4.5.2.1	General	Supported	-
4.5.2.2	The behavior of the OCS	Supported	Pending policy counters will always be provided if they are present in the OCS data. In the case of a general Sy subscription (where no policy counters are specifically defined in the original Spending-Limit-Request (SLR)), OCS will always report the policy counter changes. This includes the change where a subscriber is associated with a new policy counter, which was not present at the time of the initial SLR.
4.5.2.3	Detailed behavior of the PCRF	Not applicable	Section applies to PCRF.
4.5.3	Final spending limit report request	No requirement	-
4.5.3.1	General	Supported	-
4.5.3.2	Detailed behavior of the PCRF	Not applicable	Section applies to PCRF.
4.5.3.3	The behavior of the OCS	Supported	-
5	Sy protocol	No requirement	-
5.1	Protocol support	No requirement	-

Table 4–1 (Cont.) Diameter Sy Section Compliance

Section Number	Section	Status	Notes
5.1.1	Use of Diameter base protocol	Supported	-
5.1.2	Void	No requirement	-
5.1.3	Accounting functionality	No requirement	-
5.1.4	Transport protocol	Supported	Supports Transmission Control Protocol (TCP) and Stream Control Transmission Protocol (SCTP).
5.1.5	Advertising application Support	Supported	-
5.1.6	Use of the Supported-Features attribute-value pair (AVP)	Not supported	The negotiation of supported features is not supported by Diameter Gateway.
5.2	Initialization and maintenance of connection and session	Supported	-
5.3	Sy specific AVPs	Supported	-
5.3.1	Policy-Counter-Identifier AVP	Supported	-
5.3.2	Policy-Counter-Status AVP	Supported	-
5.3.3	Policy-Counter-Status-Report AVP	Supported	-
5.3.4	SL-Request-Type AVP	Supported	-
5.3.5	Pending-Policy-Counter-Information AVP	Supported	-
5.3.6	Pending-Policy-Counter-Change-Time AVP	Supported	-
5.4	Sy reused AVPs	Partially supported	The Logical-Access-Id and Physical-Access-Id AVPs are not defined in the standard Diameter Gateway configuration.
5.5	Sy specific Experimental-Result-Code AVP values	No requirement	-
5.5.1	General	Supported	-
5.5.2	Permanent failures	Supported	-
5.5.3	Transient failures	Supported	-

Table 4–1 (Cont.) Diameter Sy Section Compliance

Section Number	Section	Status	Notes
5.6	Sy messages	No requirement	In the case of a general Sy subscription (where no policy counters are requested in the SLR), the OCS will not return the DIAMETER_ERROR_NO_AVAILABLE_POLICY_COUNTERS error by default. Instead, it will return a success SLA report and subscribe to the Sy session for updates on any new counters that are added to the given subscriber during the session. You can disable the generation of SLA reports by setting the **syRejectNoCounters** attribute to **true**.
5.6.1	Command-Code values	Supported	-
5.6.2	Spending-Limit-Request (SLR) command	Supported	-
5.6.3	Spending-Limit-Answer (SLA) command	Supported	-
5.6.4	Spending-Status-Notification-Request (SNR) command	Supported	-
5.6.5	Spending-Status-Notification-Answer (SNA) command	Supported	-
5.6.6	Session-Termination-Request (STR) command	Supported	-
5.6.7	Session-Termination-Answer (STA) command	Supported	-
Annex A (normative):	User identity for fixed broadband access network convergence	No requirement	-
Annex B (informative):	Change history	No requirement	-

Diameter Spending Limit Commands

Table 4–2 lists the compliance information for Diameter Spending Limit commands.

Table 4–2 Diameter Spending Limit Commands

Diameter Command	Status	Notes
Spending-Limit-Request (SLR)	Supported	-
Spending-Limit-Answer (SLA)	Supported	-

Spending-Limit-Request AVPs

Table 4–3 lists the compliance information for Spending-Limit-Request AVPs.

Table 4–3 Spending-Limit-Request AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
SL-Request-Type	Supported	-
Subscription-Id	Supported	-
-- Subscription-Id-Data	Supported	-
-- Subscription-Id-Type	Supported	-
Policy-Counter-Identifier	Supported	-

Spending-Limit-Answer AVPs

Table 4–4 lists the compliance information for Spending-Limit-Answer AVPs.

Table 4–4 Spending-Limit-Answer AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
Result-Code	Supported	-
Experimental-Result	Supported	-
Policy-Counter-Status-Report	Supported	-
-- Policy-Counter-Identifier	Supported	-
-- Policy-Counter-Status	Supported	-
-- Pending-Policy-Counter-Information	Supported	-
-- -- Policy-Counter-Status	Supported	-
-- -- Pending-Policy-Counter-Change-Time	Supported	-
Failed-AVP	Supported	-

Diameter Spending Status Notification Commands

Table 4–5 lists the compliance information for Diameter Spending Status Notification commands.

Table 4–5 Diameter Spending Status Notification Commands

Diameter Command	Status	Notes
Spending-Status-Notification-Request (SNR)	Supported	-
Spending-Status-Notification-Answer (SNA)	Supported	-

Spending-Status-Notification-Request AVPs

Table 4–6 lists the compliance information for Spending-Status-Notification-Request (SNR) AVPs.

Table 4–6 Spending-Status-Notification-Request AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
Policy-Counter-Status-Report	Supported	-

Spending-Status-Notification-Answer AVPs

Table 4–7 lists the compliance information for Spending-Status-Notification-Answer (SNA) AVPs.

Table 4–7 Spending-Status-Notification-Answer AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
Result-Code	Supported	-
Failed-AVP	Supported	-

Diameter Session Termination Commands

Table 4–8 lists the compliance information for Diameter Session Termination commands.

Table 4–8 Diameter Session Termination Commands

Diameter Command	Status	Notes
Session-Termination-Request (STR)	Supported	-
Session-Termination-Answer (STA)	Supported	-

Session-Termination-Request AVPs

Table 4–9 lists the compliance information for Session-Termination-Request (STR) AVPs.

Table 4–9 Session-Termination-Request AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-

Session-Termination-Answer AVPs

Table 4–10 lists the compliance information for Session-Termination-Answer (STA) AVPs.

Table 4–10 Session-Termination-Answer AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
Result-Code	Supported	-
Failed-AVP	Supported	-

5

Diameter Sh Protocol

This chapter describes how Oracle Communications Billing and Revenue Management (BRM) Elastic Charging Engine (ECE) Diameter Gateway maps the Diameter messages for Diameter Sh Protocol defined in 3GPP TS 29.329 Version 12.0. For more information, see the 3GPP Specification detail:

http://www.3gpp.org/ftp/Specs/html-info/29329.htm

Section Compliance

Table 5–1 lists the compliance information for Diameter Sh protocol sections.

Table 5–1 Diameter Sh Section Compliance

Section number	Section	Status	Notes
1	Scope	No requirement	-
2	References	No requirement	-
3	Definitions, symbols and abbreviations	No requirement	-
3.1	Definitions	No requirement	-
3.2	Abbreviations	No requirement	-
4	General	No requirement	-
5	Use of the Diameter base protocol	Supported	-
6	Diameter application for Sh interface	Supported	-
6.1	Command-Code values	Partially supported	Profile-Update-Request and Profile-Update-Answer are not supported
6.1.1	User-Data-Request (UDR) Command	Supported	-
6.1.2	User-Data-Answer (UDA) Command	Supported	-
6.1.3	Profile-Update-Request (PUR) Command	Not supported	-
6.1.4	Profile-Update-Answer (PUA) Command	Not supported	-
6.1.5	Subscribe-Notifications-Request (SNR) Command	Supported	-
6.1.6	Subscribe-Notifications-Answer (SNA) Command	Supported	-
6.1.7	Push-Notification-Request (PNR) Command	Supported	-
6.1.8	Push-Notifications-Answer (PNA) Command	Supported	-

Table 5–1 (Cont.) Diameter Sh Section Compliance

Section number	Section	Status	Notes
6.2	Result-Code attribute-value pair (AVP) values	No requirement	-
6.2.1	Success	Supported	-
6.2.2	Permanent Failures	No requirement	-
6.2.2.1	DIAMETER_ERROR_USER_DATA_NOT_ RECOGNIZED (5100)	Not applicable	-
6.2.2.2	DIAMETER_ERROR_OPERATION_NOT_ ALLOWED (5101)	Not supported	-
6.2.2.3	DIAMETER_ERROR_USER_DATA_ CANNOT_BE_READ (5102)	Not supported	-
6.2.2.4	DIAMETER_ERROR_USER_DATA_ CANNOT_BE_MODIFIED (5103)	Not supported	-
6.2.2.5	DIAMETER_ERROR_USER_DATA_ CANNOT_BE_NOTIFIED (5104)	Not supported	-
6.2.2.6	DIAMETER_ERROR_TOO_MUCH_DATA (5008)	Not supported	-
6.2.2.7	DIAMETER_ERROR_TRANSPARENT_ DATA OUT_OF_SYNC (5105)	Not supported	-
6.2.2.8	DIAMETER_ERROR_FEATURE_ UNSUPPORTED (5011)	Not supported	-
6.2.2.9	DIAMETER_ERROR_SUBS_DATA_ABSENT (5106)	Supported	Generated in absence of requested Data-Reference preferences.
6.2.2.10	DIAMETER_ERROR_NO_SUBSCRIPTION_ TO_DATA (5107)	Not applicable	-
6.2.2.11	DIAMETER_ERROR_DSAI_NOT_ AVAILABLE (5108)	Not supported	-
6.2.2.12	DIAMETER_ERROR_IDENTITIES_DONT_ MATCH (5002)	Not supported	-
6.2.3	Transient Failures	No requirement	-
6.2.3.1	DIAMETER_USER_DATA_NOT_ AVAILABLE (4100)	Not supported	-
6.2.3.2	DIAMETER_PRIOR_UPDATE_IN_ PROGRESS (4101)	Not supported	-
6.3	Attribute-value pairs (AVPs)	No requirement	-
6.3.1	User-Identity	Supported	-
6.3.2	Mobile station international subscriber directory number (MSISDN)	Supported	-
6.3.3	User-Data	Supported	-
6.3.4	Data-Reference	Supported	Used to identify the preferences requested by the policy and charging rules function (PCRF)
6.3.5	Service-Indication	Not supported	-
6.3.6	Subs-Req-Type	Supported	-

Table 5–1 (Cont.) Diameter Sh Section Compliance

Section number	Section	Status	Notes
6.3.7	Requested-Domain	Not supported	-
6.3.7A	Requested-Nodes	Not supported	-
6.3.8	Current-Location	Not supported	-
6.3.9	Server-Name	Not supported	-
6.3.10	Identity-Set	Not supported	-
6.3.11	Supported-Features	Not supported	-
6.3.12	Feature-List-ID	Not supported	-
6.3.13	Feature-List	Not supported	-
6.3.14	Supported-Applications	Not supported	-
6.3.15	Public-Identity	Supported	-
6.3.16	Expiry-Time	Supported	-
6.3.17	Send-Data-Indication	Supported	-
6.3.18	DSAI-Tag	Not supported	-
6.3.19	Wildcarded-Public-Identity	Not supported	-
6.3.20	Wildcarded-IMPU	Not supported	-
6.3.21	Session-Priority	Not supported	-
6.3.22	One-Time-Notification	Not supported	-
6.3.23	Serving-Node-Indication	Not supported	-
6.3.24	Repository-Data-ID	Not supported	-
6.3.25	Sequence-Number	Not supported	-
6.3.26	Pre-paging-Supported	Not supported	-
6.3.27	Local-Time-Zone-Indication	Not supported	-
6.3.28	UDR-Flags	Not supported	-
6.3.29	Call-Reference-Info	Not supported	-
6.3.30	Call-Reference-Number	Not supported	-
6.3.31	AS-Number	Not supported	-
6.3.32	OC-Supported-Features	Not supported	-
6.3.33	OC-OLR	Not supported	-
6.4	Use of namespaces	No requirement	-
6.4.1	AVP codes	No requirement	-
6.4.2	Experimental-Result-Code AVP values	No requirement	-
6.4.3	Command Code values	No requirement	-
6.4.4	Application-ID value	Supported	-
7	Special Requirements	No requirement	-
7.1	Version Control	Not supported	-
Annex A	Change history	No requirement	-

Diameter User Data Commands

Table 5–2 lists the compliance information for Diameter User Data commands for Diameter Sh protocol.

Table 5–2 Diameter User Data Commands

Diameter Command	Status	Notes
User-Data-Request (UDR)	Supported	-
User-Data-Answer (UDA)	Supported	-

User-Data-Request AVPs

Table 5–3 lists the compliance information for User-Data-Request AVPs.

Table 5–3 User-Data-Request AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
User-Identity	Supported	-
-- Public-Identity	Supported	-
Data-Reference	Supported	-
Wildcarded-Public-Identity	Not supported	-
Wildcarded-IMPU	Not supported	-
Server-Name	Not supported	-
Service-Indication	Not supported	-
Identity-Set	Not supported	-
Requested-Domain	Not supported	-
Current-Location	Not supported	-
DSAI-Tag	Not supported	-
Session-Priority	Not supported	-
User-Name	Not supported	-
Requested-Nodes	Not supported	-
Serving-Node-Indication	Not supported	-
Pre-Paging-Supported	Not supported	-
Local-Time-Zone-Indication	Not supported	-
UDR-Flags	Not supported	-
Call-Reference-Info	Not supported	-

User-Data-Answer AVPs

Table 5–4 lists the compliance information for User-Data-Answer AVPs.

Table 5–4 User-Data-Answer AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-

Table 5–4 (Cont.) User-Data-Answer AVPs

Diameter AVP	Status	Notes
Result-Code	Supported	-
Experimental-Result	Supported	-
User-Data	Supported	-
Wildcarded-Public-Identity	Not supported	-
Wildcarded-IMPU	Not supported	-

Diameter Profile Update Commands

Diameter Gateway does *not* support Profile-Update-Request (PUR) and Profile-Update-Answer (PUA) commands.

Diameter Subscribe Notifications Commands

Table 5–5 lists the compliance information for Diameter Subscribe Notifications commands.

Table 5–5 Diameter Subscribe Notifications Commands

Diameter Command	Status	Notes
Subscribe-Notifications-Request (SNR)	Supported	-
Subscribe-Notifications-Answer (SNA)	Supported	-

Subscribe-Notifications-Request AVPs

Table 5–6 lists the compliance information for Subscribe-Notifications-Request (SNR) AVPs.

Table 5–6 Subscribe-Notifications-Request AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
User-Identity	Supported	-
-- Public-Identity	Supported	-
Data-Reference	Supported	-
Subs-Req-Type	Supported	-
Expiry-Time	Supported	-
Send-Data-Indication	Supported	-
Wildcarded-Public-Identity	Not supported	-
Wildcarded-IMPU	Not supported	-
Service-Indication	Not supported	-
Server-Name	Not supported	-
Identity-Set	Not supported	-
DSAI-Tag	Not supported	-
One-Time-Notification	Not supported	-

Table 5–6 (Cont.) Subscribe-Notifications-Request AVPs

Diameter AVP	Status	Notes
User-Name	Not supported	-

Subscribe-Notifications-Answer AVPs

Table 5–7 lists the compliance information for Subscribe-Notifications-Answer (SNA) AVPs.

Table 5–7 Subscribe-Notifications-Answer AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
Result-Code	Supported	-
Experimental-Result	Supported	-
User-Data	Supported	-
Expiry-Time	Supported	-
Failed-AVP	Supported	-
Wildcarded-Public-Identity	Not supported	-
Wildcarded-IMPU	Not supported	-

Diameter Push Notification Commands

Table 5–8 lists the compliance information for Diameter Push Notification commands.

Table 5–8 Diameter Push Notification Commands

Diameter Command	Status	Notes
Push-Notification-Request (PNR)	Supported	-
Push-Notification-Answer (PNA)	Supported	-

Push-Notification-Request AVPs

Table 5–9 lists the compliance information for Push-Notification-Request AVPs.

Table 5–9 Push-Notification-Request AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
User-Identity	Supported	-
User-Data	Supported	-
Wildcarded-Public-Identity	Not supported	-
Wildcarded-IMPU	Not supported	-
User-Name	Not supported	-

Push-Notification-Answer AVPs

Table 5–10 lists the compliance information for Push-Notification-Answer AVPs.

Table 5–10 Push-Notification-Answer AVPs

Diameter AVP	Status	Notes
Session-Id	Supported	-
Result-Code	Supported	-
Failed-AVP	Supported	-

A

Diameter Gateway Modified and Custom AVPs

This appendix describes the modified and custom attribute-value pairs (AVPs) used by Oracle Communications Billing and Revenue Management (BRM) Elastic Charging Engine (ECE) Diameter Gateway.

Modified AVPs

Oracle has modified several standard AVPs to include functionality that is not defined in the RFC or 3GPP specifications, such as top-up and balance-specific debits and refunds.

Requested-Action

AVP code: 436

Type: Enumerated

The Requested-Action AVP is used by the Diameter Gateway to indicate the requested action in the Credit-Control-Request command. This AVP has been extended with Top-Up and Balance_Query enumerations.

Table A–1 shows the list of enumerations defined for the Requested-Action AVP.

Table A–1 Requested-Action Enumerations

Enumeration	Value	Notes
DIRECT_DEBITING	0	See https://tools.ietf.org/html/rfc4006#section-8.41 for information on DIRECT_DEBITING.
REFUND_ACCOUNT	1	See https://tools.ietf.org/html/rfc4006#section-8.41 for information on REFUND_ACCOUNT.
CHECK_BALANCE	2	Diameter Gateway does not support CHECK_BALANCE.
PRICE_ENQUIRY	3	See https://tools.ietf.org/html/rfc4006#section-8.41 for information on PRICE_ENQUIRY.
TOP-UP	4	Indicates a request to recharge the end user's account with the information specified in the ORA-Account-Topup AVP. The balance valid on the end user's account after the top-up is returned in the ORA-Balance-Element AVP in the Credit-Control response.

Table A–1 (Cont.) Requested-Action Enumerations

Enumeration	Value	Notes
BALANCE_QUERY	5	Indicates a request for the current valid balance of the end user, which will be returned in an ORA-Balance-Element AVP in the Credit-Control response. The level of detail of the response can be modified by the ORA-Balance-Query-Mode AVP. The balances returned can be filtered on the server to a product by specifying Service-Indicator and Rating-Group AVPs in the request.

Multiple-Services-Credit-Control

AVP code: 456

Type: Grouped

The Multiple-Services-Credit-Control AVP has been extended to include some Oracle specific AVPs, which are used to return additional information related to an event or a session.

The Multiple-Services-Credit-Control AVP supported by Diameter Gateway is defined as follows:

```
Multiple-Services-Credit-Control ::= < AVP Header: 456 >
                                       [ Granted-Service-Unit ]
                                       [ Requested-Service-Unit ]
                                     * [ Used-Service-Unit ]
                                       [ Service-Identifier ]
                                       [ Rating-Group ]
                                       [ Validity-Time ]
                                       [ Result-Code ]
                                       [ Final-Unit-Indication ]
                                       [ ORA-Customer-Cost-Information ]
                                       [ ORA-Remaining-Balance ]
                                       [ ORA-Credit-Threshold-Breach ]
```

Requested-Service-Unit

AVP code: 437

Type: Grouped

The Requested-Service-Unit AVP has been extended to include the CC-ORA-Balance-Element AVP to allow a specific balance type to be charged in a direct-debit request or refunded in a refund request.

The Requested-Service-Unit AVP supported by Diameter Gateway is defined as follows:

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

Note: The CC-Money and CC-ORA-Balance-Element AVPs are only supported in the context of a direct-debit request or a refund request. They are not supported for event or session reservation scenarios.

Granted-Service-Unit

AVP code: 431

Type: Grouped

The Granted-Service-Unit AVP has been extended to include the CC-ORA-Balance-Element AVP to confirm that a specific balance type has been charged in a direct-debit response or refunded in a refund response.

The Granted-Service-Unit AVP supported by Diameter Gateway is defined as follows:

```
Granted-Service-Unit ::= < AVP Header: 431 >
                         [ CC-Time ]
                         [ CC-Money ]
                         [ CC-Total-Octets ]
                         [ CC-Input-Octets ]
                         [ CC-Output-Octets ]
                         [ CC-Service-Specific-Units ]
                         [ CC-ORA-Balance-Element ]
```

Note: The CC-Money and CC-ORA-Balance-Element AVPs are only supported in the context of a direct-debit response or a refund response. They are not supported for event or session reservation scenarios.

Custom AVPs

Diameter Gateway uses some Oracle-specific AVPs other than the standard AVPs defined in the supported RFC or 3GPP standards. The Oracle-specific AVPs contain ORA- in its name and the vendor ID for these AVPs is 3512.

ORA-Balance-Element-Id

AVP code: 233

Type: Unsigned32

The ORA-Balance-Element-Id AVP is used to indicate the unique ID of a requested or returned balance element. A balance element can represent a currency or noncurrency asset of economic value, such as U.S. dollars, or a counter, such as loyalty points. A currency balance has an ORA-Balance-Element-Id equivalent to the ISO-4217 currency number; a noncurrency balance has an operator defined ID, such as 1000050.

ORA-Validity-Start-Time

AVP code: 213

Type: Time

The ORA-Validity-Start-Time AVP is used to indicate the valid-from date of a balance instance returned by Diameter Gateway. ORA-Validity-Start-Time can also be used in a top-up request to provide a specific date that the recharged balance should be available to be used from.

Note: Only the balances that are valid at the time of the request are returned by ECE.

ORA-Validity-End-Time

AVP code: 214

Type: Time

The ORA-Validity-End-Time AVP is used by the Diameter Gateway server to indicate the expiry date of a returned balance instance. This AVP can be used by a client in a top-up request to provide a specific date that the recharged balance should expire on.

CC-ORA-Balance-Element

AVP code: 236

Type: Grouped

The CC-ORA-Balance-Element AVP can be used in a debit or a refund to specify an exact balance against which the operation should be made.

The CC-ORA-Balance-Element AVP is defined as follows:

```
CC-ORA-Balance-Element ::== < AVP-Header: 236 3512 >
                             { ORA-Balance-Element-Id }
                             { Unit-Value }
```

ORA-Balance-Query-Mode

AVP code: 248

Type: Enumerated

The ORA-Balance-Query-Mode AVP is used by the client to indicate the level of detail required in a balance query.

Table A–2 shows the list of values defined for the ORA-Balance-Query-Mode AVP:

Table A–2 ORA-Balance-Query-Mode Values

Mode	Value	Notes
SUMMARY	1	Returns the total value for each balance instance and expiries. This is the default mode if ORA-Balance-Query-Mode is not specified.
FULL	2	Returns all balance information, including Credit Floor and Credit Ceiling limits, Thresholds, and Active reservations.

ORA-Balance-Details

AVP code: 249

Type: Grouped

The ORA-Balance-Details AVP is returned by ECE in response to a balance query and returns an array of all balances valid against the account (that is, the balance start date is in the past and the expiry date, if set, is in the future).

The ORA-Balance-Details AVP is defined as follows:

```
ORA-Balance-Details ::== < AVP-Header: 249 3512 >
                       * { ORA-Balance-Element }
```

ORA-Remaining-Balance

AVP code: 241

Type: Grouped

The ORA-Remaining-Balance AVP is returned in the Multiple-Services-Credit-Control AVP and also as a response to a top-up request. This AVP indicates the remaining credit the end user has that is applicable to the service.

To have the ORA-Remaining-Balance AVP returned in a Debit/Refund response, you must set the **remainingBalanceCalcMode** variable of the ECE **charging.server** MBean to **CURRENT_BALANCE**. For information about setting this variable, see the discussion about configuring charging runtime options in *BRM Elastic Charging Engine Implementation Guide*.

The ORA-Remaining-Balance AVP is defined as follows:

```
ORA-Remaining-Balance ::== < AVP-Header: 241 3512 >
                         * { ORA-Balance-Element }
                         * [ ORA-Applicable-Services ]
                           [ ORA-Subscriber-Id ]
```

Note: ORA-Subscriber-Id is used to indicate which account the remaining balance returned is applicable to. ORA-Applicable-Services is only returned in a top-up response, and ORA-Subscriber-Id is only returned in a Multiple-Services-Credit-Control response.

ORA-Applicable-Services

AVP code: 242

Type: Grouped

The ORA-Applicable-Services AVP is returned as part of a top-up response to indicate which services the top-up could be used for. For every product applicable, Diameter Gateway does a reverse lookup of the Diameter Mediation table to convert the product into a Service-Identifier and Rating-Group pair.

The ORA-Applicable-Services AVP is defined as follows:

```
ORA-Applicable-Services ::== < AVP-Header: 242 3512 >
                             { Service-Identifier }
                             { Rating-Group }
```

ORA-Balance-Element

AVP code: 243

Type: Grouped

The ORA-Balance-Element AVP is used in both balance query and remaining balance responses. It returns information on a single balance element. The Unit-Value AVP amount in the ORA-Balance-Element AVP is the total sum of all the end users' instances of the balance on ECE, with the individual balance instance values provided in the ORA-Balance-Item AVP. The Unit-Value AVP amount is the total available unreserved value of the balance.

The ORA-Balance-Element AVP is defined as follows:

```
ORA-Balance-Element ::== < AVP-Header: 243 3512 >
                         { ORA-Balance-Element-Id }
```

```
                    { Unit-Value }
                  * { ORA-Balance-Item }
                    [ ORA-Earliest-Expiry-Time ]
                    [ ORA-Credit-Floor ]
                    [ ORA-Credit-Ceiling ]
                    [ ORA-Percent-Credit-Threshold ]
                    [ ORA-Fixed-Credit-Threshold ]
                    [ Service-Identifier ]
                    [ Rating-Group ]
```

ORA-Balance-Item

AVP code: 244

Type: Grouped

The ORA-Balance-Item AVP returns the details of a single balance element instance within a balance element. The Unit-Value AVP contains the available unreserved value of the balance element instance.

The ORA-Balance-Item AVP is defined as follows:

```
ORA-Balance-Item ::== < AVP-Header: 244 3512 >
                      { Unit-Value }
                      [ ORA-Validity-Start-Time ]
                      [ ORA-Validity-End-Time ]
                      [ ORA-Consumed-Reservation-Amount ]
                      [ ORA-Active-Reservation-Amount ]
```

ORA-Earliest-Expiry-Time

AVP code: 245

Type: Time

The ORA-Earliest-Expiry-Time AVP returns the earliest expiry time when an array of balance instances is returned by Diameter Gateway in the ORA-Balance-Item AVP, which has one or more balance instances with an expiry time.

ORA-Active-Reservation-Amount

AVP code: 250

Type: Grouped

The ORA-Active-Reservation-Amount AVP returns the unused reservation being held against the balance element.

The ORA-Active-Reservation-Amount AVP is defined as follows:

```
ORA-Active-Reservation-Amount ::== < AVP-Header: 250 3512 >
                                   { Value-Digits }
                                   [ Exponent ]
```

ORA-Consumed-Reservation-Amount

AVP code: 251

Type: Grouped

The ORA-Consumed-Reservation-Amount AVP returns the used reservation being held against the balance element.

The ORA-Consumed-Reservation-Amount AVP is defined as follows:

```
ORA-Consumed-Reservation-Amount ::== < AVP-Header: 251 3512 >
                                     { Value-Digits }
                                     [ Exponent ]
```

ORA-Credit-Ceiling

AVP code: 253

Type: Grouped

The ORA-Credit-Ceiling AVP returns the information on the maximum credit permitted for the subscriber for the balance element.

The ORA-Credit-Ceiling AVP is defined as follows:

```
ORA-Credit-Ceiling ::== < AVP-Header: 253 3512 >
                        { Value-Digits }
                        [ Exponent ]
```

ORA-Credit-Floor

AVP code: 252

Type: Grouped

The ORA-Credit-Floor AVP returns the information on the minimum credit allowed for the subscriber for the balance element.

The ORA-Credit-Floor AVP is defined as follows:

```
ORA-Credit-Floor ::== < AVP-Header: 252 3512 >
                      { Value-Digits }
                      [ Exponent ]
```

ORA-Fixed-Credit-Threshold

AVP code: 255

Type: Grouped

The ORA-Fixed-Credit-Threshold AVP returns all the fixed credit thresholds set against the balance element for the subscriber.

The ORA-Fixed-Credit-Threshold AVP is defined as follows:

```
ORA-Fixed-Credit-Threshold ::== < AVP-Header: 255 3512 >
                                * { ORA-Threshold-Value }
```

ORA-Percent-Credit-Threshold

AVP code: 254

Type: Grouped

The ORA-Percent-Credit-Threshold AVP returns all the percentage credit thresholds set against the balance element for the subscriber.

The ORA-Percent-Credit-Threshold AVP is defined as follows:

```
ORA-Percent-Credit-Threshold ::== < AVP-Header: 254 3512 >
                                  * { ORA-Threshold-Value }
```

ORA-Threshold-Value

AVP code: 256

Type: UTF8String

The ORA-Threshold-Value AVP provides detail on a single fixed or percent threshold. It contains individual values of threshold that form a collection of either percentage credit thresholds or fixed credit thresholds.

ORA-Subscriber-Id

AVP code: 235

Type: OctetString

The ORA-Subscriber-Id AVP returns an ID representation for the subscriber that the balance is associated with.

The format of ORA-Subscriber-Id is as follows:

```
<subscriberId>:<productType>
```

where:

- *subscriberId* is the subscriber identifier. It correlates with the Subscription-Id-Data AVP when the balance is directly associated with the requesting end user.
- *productType* is the type of product (for example, TelcoGsm telephony).

ORA-Customer-Cost-Information

AVP code: 231

Type: Grouped

The ORA-Customer-Cost-Information AVP returns the cost information for the requested reservation, charge, or refund. In the case of a reservation initiate, the cost indicated is units of entire reservation used. For a reservation update, the cost is the total of used units for the session and the cost of the entire granted reservation. For a terminate, debit, or refund, the cost is the total charge.

To have the ORA-Customer-Cost-Information AVP returned, you must set the **adviceOfChargeNotificationMode** variable of the **charging.notification** ECE MBean to **PIGGYBACK**. For information about setting this variable, see the discussion about configuring notifications for online charging in *BRM Elastic Charging Engine Implementation Guide*.

The ORA-Customer-Cost-Information AVP is defined as follows:

```
ORA-Customer-Cost-Information ::== < AVP-Header: 231 3512 >
                                    { ORA-Subscriber-Id }
                                  * { ORA-Cost-Information }
```

ORA-Credit-Threshold-Breach

AVP code: 301

Type: Grouped

The ORA-Credit-Threshold-Breach AVP is returned by Diameter Gateway whenever a threshold breach has occurred for a subscriber:

- In the period since the last update for a session
- As a result of the charge
- As a refund for a direct event

The ORA-Credit-Threshold-Breach AVP is defined as follows:

```
ORA-Credit-Threshold-Breach ::== < AVP-Header: 301 3512 >
                                 { ORA-Balance-Element-Id }
                                 { ORA-Current-Balance }
                                 { ORA-Breach-Direction }
                                 [ ORA-Fixed-Threshold-Values ]
                                 [ ORA-Percentage-Threshold-Values ]
```

ORA-Breach-Direction

AVP code: 307

Type: Enumerated

The ORA-Breach-Direction AVP indicates the direction of a balance change that caused the credit threshold breach to occur.

Table A–3 shows the list of enumerations defined for the ORA-Breach-Direction AVP:

Table A–3 ORA-Breach-Direction Enumerations

Enumeration	Value	Notes
THRESHOLD_BREACH_UP	0	-
THRESHOLD_BREACH_DOWN	1	-

ORA-Current-Balance

AVP code: 302

Type: Grouped

The ORA-Current-Balance AVP returns the post-breach value of the balance for which the threshold breach notification is generated.

The ORA-Current-Balance AVP is defined as follows:

```
ORA-Current-Balance ::== < AVP-Header: 302 3512 >
                         { Value-Digits }
                         [ Exponent ]
```

ORA-Fixed-Threshold-Values

AVP code: 303

Type: Grouped

The ORA-Fixed-Threshold-Values AVP returns all of the thresholds that have been breached as the result of the transaction that caused notification. In the case of multiple breaches, the ORA-Fixed-Threshold AVP appears for each threshold that is breached.

The ORA-Fixed-Threshold-Values AVP is defined as follows:

```
ORA-Fixed-Threshold-Values ::== < AVP-Header: 303 3512 >
                                * { ORA-Fixed-Threshold }
```

ORA-Fixed-Threshold

AVP code: 304

Type: Grouped

The ORA-Fixed-Threshold AVP returns a fixed threshold that is breached.

The ORA-Fixed-Threshold AVP is defined as follows:

```
ORA-Fixed-Threshold ::== < AVP-Header: 304 3512 >
                         { Value-Digits }
                         [ Exponent ]
```

ORA-Percentage-Threshold-Values

AVP code: 305

Type: Grouped

The ORA-Percentage-Threshold-Values AVP returns all of the percentage thresholds that have been breached. In the case of multiple threshold breaches, the ORA-Percentage-Threshold AVP appears for each threshold that was breached.

The ORA-Percentage-Threshold-Values AVP is defined as follows:

```
ORA-Percentage-Threshold-Values ::== < AVP-Header: 305 3512 >
                                    * { ORA-Percentage-Threshold }
```

ORA-Percentage-Threshold

AVP code: 306

Type: Grouped

The ORA-Percentage-Threshold AVP returns the percentage threshold that is breached to cause the notification.

The ORA-Percentage-Threshold AVP is defined as follows:

```
ORA-Percentage-Threshold ::== < AVP-Header: 306 3512 >
                              { Value-Digits }
                              [ Exponent ]
```

ORA-Account-Topup

AVP code: 206

Type: Grouped

The ORA-Account-Topup AVP is used to submit recharge requests to ECE and returns a single unique recharge reference and one or more balance credits to apply to the account.

The ORA-Account-Topup AVP is defined as follows:

```
ORA-Account-Topup ::== < AVP-Header: 206 3512 >
                         { ORA-Recharge-Reference }
                        * { ORA-Balance }
```

ORA-Recharge-Reference is used for correlating the initiating top-up system and BRM, to allow auditing of recharges. It is also used as part of the duplicate detection mechanism and must be unique for each recharge.

ORA-Recharge-Reference

AVP code: 207

Type: UTF8string

The ORA-Recharge-Reference AVP must be included with a top-up and is used for correlation between the initiating top-up system and BRM to allow auditing of recharges. This AVP is also used as part of the duplicate detection mechanism and must be unique for each recharge.

ORA-Balance

AVP code: 208

Type: Grouped

The ORA-Balance AVP is used as part of a top-up request to specify the balance to recharge. ECE attempts to recharge the balance identified by using the ORA-Balance-Element-Id AVP for the amount specified in the Unit-Value AVP. The valid from and expiry information are optional. For a product-level recharge, the Service-Identifier and Rating-Group AVPs are used to reference the Diameter Mediation table to determine the target product type.

The ORA-Balance AVP is defined as follows:

```
ORA-Balance ::== < AVP-Header: 208 3512 >
                 { ORA-Balance-Element-Id }
                 { Unit-Value }
                 [ ORA-Validity-Start-Time ]
                 [ ORA-Validity-Start-Relative ]
                 [ ORA-Validity-End-Time ]
                 [ ORA-Validity-End-Relative ]
                 [ ORA-First-Usage-Validity ]
                 [ ORA-Extend-Bucket-Validity ]
                 [ Service-Identifier ]
                 [ Rating-Group ]
```

When associating a start date to the balance recharge, either ORA-Validity-Start-Time or ORA-Validity-Start-Relative should be provided, and the ORA-Extend-Bucket-Validity AVP should not be True. If no start date is provided, it is set to the time of the recharge. When providing an expiry date for the balance recharge, only ORA-Validity-End-Time, ORA-Validity-End-Relative, or ORA-First-Usage-Validity should be set. If ORA-Extend-Bucket-Validity is set to True, the recharge value is added to the first expiring existing balance, and the final expiry is the latest of either the current expiry or the provided expiry. If no expiry date is provided, the recharged balance never expires.

Note: Setting an expiry date for a currency balance is not possible.

ORA-Extend-Bucket-Validity

AVP code: 228

Type: Enumerated

The ORA-Extend-Bucket-Validity AVP is used in a top-up to determine if the recharge amount is to be added in current balance or a new balance should be created. It is ignored for first-use recharges, if there is no balance present, and also if the validity start date specified in the request is in the future.

Table A–4 shows the list of enumerations defined for the ORA-Extend-Bucket-Validity AVP:

Table A–4 ORA-Extend-Bucket-Validity Enumerations

Enumeration	Value	Notes
TRUE	1	ECE creates a new balance instance to persist the recharge in. This is the default behavior if ORA-Extend-Bucket-Validity is not specified for the recharge balance.
FALSE	0	ECE attempts to add the recharge balance to an existing balance instance if one is present, otherwise it creates a new balance instance.

ORA-Validity-End-Relative

AVP code: 216

Type: Grouped

The ORA-Validity-End-Relative AVP is used by the top-up client to specify the desired offset for the end date of the balance being recharged. ECE uses this offset to calculate the expiry date, relative from the time the request is received by ECE.

The ORA-Validity-End-Relative AVP is defined as follows:

```
ORA-Validity-End-Relative ::== < AVP-Header: 216 3512 >
                               { ORA-Validity-Offset }
                               { ORA-Validity-Unit }
```

ORA-Validity-Start-Relative

AVP code: 215

Type: Grouped

The ORA-Validity-Start-Relative AVP is used by the top-up client to specify the desired offset for the start date of the balance being recharged. ECE uses this offset to calculate the valid-from date, relative from the time the request is received by ECE.

The ORA-Validity-Start-Relative AVP is defined as follows:

```
ORA-Validity-Start-Relative ::== < AVP-Header: 215 3512 >
                                 { ORA-Validity-Offset}
                                 { ORA-Validity-Unit }
```

ORA-First-Usage-Validity

AVP code: 217

Type: Grouped

The ORA-First-Usage-Validity AVP is used by the top-up client to specify the desired offset for the end date of the balance being recharged. ECE stores this offset with the recharged balance; the first time the balance is used, it uses the offset to calculate and set the expiry date relative from the time of that first use.

The ORA-First-Usage-Validity AVP is defined as follows:

```
ORA-First-Usage-Validity ::== < AVP-Header: 217 3512 >
                              { ORA-Validity-Unit }
                              [ ORA-Validity-Offset ]
```

ORA-Validity-Offset

AVP code: 218

Type: Unsigned32

The ORA-Validity-Offset AVP indicates the number of units (defined in the associated ORA-Validity-Unit AVP) that ECE should use in the start or expiry date calculations.

ORA-Validity-Unit

AVP code: 219

Type: Enumerated

The ORA-Validity-Unit AVP is used by the client to specify the units of offset for a relative validity recharge.

Table A–5 shows the list of enumerations defined for the ORA-Validity-Unit AVP:

Table A–5 ORA-Validity-Unit Enumerations

Enumeration	Value	Notes
SECONDS	0	-
MINUTES	1	-
HOURS	2	-
DAYS	3	-
MONTHS	4	-
ACC_CYCLE	5	-
BILL_CYCLE	6	-
ABSOLUTE	7	-
INFINITE	8	-

Note: ABSOLUTE and INFINITE are only applicable for first-use top-ups. If ABSOLUTE is set, then the ORA-Validity-End-Time must be provided in the ORA-Balance AVP. INFINITE is interpreted as a top-up for a first-use balance if expiry is not set on first-use.

For ACC_CYCLE and BILL_CYCLE, zero units specifies a date at the end of the current cycle, and one unit specifies the date at the end of the next cycle.