

**Oracle® Communications  
Convergent Charging Controller**

Diameter Control Driver Compliance Protocol  
Implementation Conformance Statement

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# About This Document

## Scope

The purpose of this document is to describe the Convergent Charging Controller implementation of the DIAMETER protocol for the purposes of real-time charging.

## Audience

This guide is intended for use by software engineers and testers that need a description of the SCP<->BE messages used by the DCD that is more detailed than that provided by the SRS and technical guide.

It is assumed that readers are familiar with CCS and the DIAMETER RFCs.

## Related Documents

The following documents are related to this document:

- RFC 6733 Diameter Base Protocol
- RFC 4006 Diameter Credit Control Application
- *Diameter Control Agent Technical Guide*
- Diameter and Diameter Control Agent SRS
- 3GPP TS 32.299 V6.3.0 (2005-06) - 3rd Generation Partnership Project; Technical Specification Group Service and System Aspects; Telecommunication management; Charging management; Diameter charging applications (Release 6)

# Document Conventions

## Typographical Conventions

The following terms and typographical conventions are used in the Oracle Communications Convergent Charging Controller documentation.

| Formatting Convention                    | Type of Information                                                                                                                              |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Special Bold</b>                      | Items you must select, such as names of tabs.<br>Names of database tables and fields.                                                            |
| <i>Italics</i>                           | Name of a document, chapter, topic or other publication.<br>Emphasis within text.                                                                |
| <b>Button</b>                            | The name of a button to click or a key to press.<br><b>Example:</b> To close the window, either click <b>Close</b> , or press <b>Esc</b> .       |
| <b>Key+Key</b>                           | Key combinations for which the user must press and hold down one key and then press another.<br><b>Example:</b> <b>Ctrl+P</b> or <b>Alt+F4</b> . |
| Monospace                                | Examples of code or standard output.                                                                                                             |
| <b>Monospace Bold</b>                    | Text that you must enter.                                                                                                                        |
| <i>variable</i>                          | Used to indicate variables or text that should be replaced with an actual value.                                                                 |
| <b>menu option &gt; menu option &gt;</b> | Used to indicate the cascading menu option to be selected.<br><b>Example:</b> <b>Operator Functions &gt; Report Functions</b>                    |
| <a href="#">hypertext link</a>           | Used to indicate a hypertext link.                                                                                                               |

Specialized terms and acronyms are defined in the glossary at the end of this guide.

# Compliance Statement

## Overview

### Introduction

This chapter introduces the Diameter Control Driver (DCD) compliance limitations.

### In this chapter

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This chapter contains the following topics.

DCD Overview ..... 1

## DCD Overview

### Introduction

The Diameter Charging Driver (DCD) is an interface used by CCS to allow communication of billing requests from an SLC to a billing platform using the DIAMETER protocol. The DIAMETER base protocol is defined by RFC 6733, and extended to include real-time credit-control messages by RFC 4006.

The DCD (and thus this document) only covers the use of CCS as a DIAMETER client. For information about CCS acting as a DIAMETER server, see the Diameter Control Agent (DCA) documentation.

The DCD client runs on the SLC SLEE, taking requests from the billing actions of `slee_acs` and forwards them to the billing engine. It maintains the connections to the billing engines (or, if configured, DIAMETER proxies).

### General restrictions

Specific adherence to the RFCs is described in a later section, but there are some general properties of DIAMETER that are not handled by the DCD.

They are:

- TLS (RFC 2246) is not supported.
- Authentication and Authorization messages are not supported
- Tariff Time Change is not supported
- Dynamic peer discovery is not performed.
- Sub-sessions are not supported.



# Diameter Message Encoding

## Overview

### Introduction

This chapter details the Diameter Charging Driver (DCD) message encoding.

### In this chapter

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This chapter contains the following topics.

Diameter Message Encoding ..... 3

## Diameter Message Encoding

### Introduction

The DCD client will send (and expect to receive) DIAMETER messages that have a basic encoding in complete compliance with RFC 6733.

### Diameter Headers

The header of Diameter messages sent by DCD are fully compliant with RFC 6733.

The individual parameters are:

| Field                 | Type/Length         | Comment                                                                                                                                              |
|-----------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Version               | 1 byte              | Always set to 1                                                                                                                                      |
| Message Length        | 3 bytes             | Length includes header fields.                                                                                                                       |
| Command Flags         | 1 byte              | Format: <i>RPETrrrr</i><br>All set as per RFC 6733.                                                                                                  |
| Command Code          | 3 bytes             | Will be one of: <ul style="list-style-type: none"> <li>• 257 (CER/A)</li> <li>• 280 (DWR/A)</li> <li>• 282 (DPR/A)</li> <li>• 272 (CCR/A)</li> </ul> |
| Application ID        | 4 bytes             | Set to 4 for CCRs, 0 for all other message types.                                                                                                    |
| Hop-by-hop identifier | Unsigned32; 4 bytes | as per RFC 6733                                                                                                                                      |
| End-to-end identifier | Unsigned32; 4 bytes | as per RFC 6733                                                                                                                                      |

## Attribute-Value Pairs (AVPs)

The header on an AVP consists of the following fields:

| Field      | Type/Length | Comment                                                                                                                                                                                                                                                                                                      |
|------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AVP Code   | 4 bytes     |                                                                                                                                                                                                                                                                                                              |
| AVP Flags  | 1 byte      | Format: <i>VMPrrrrr</i> .<br><i>V</i> is vendor bit. Will be set only if a vendor-ID is used.<br><i>M</i> is mandatory bit: If the AVPCode is from RFC 6733 or 4006, the bit is set. Otherwise (for example, a vendor specific AVP code), the bit is not set.<br><i>P</i> is encryption indicator. Set to 0. |
| AVP Length | 3 bytes     | AVP length in bytes, including these header fields.                                                                                                                                                                                                                                                          |
| Vendor-ID  | 4 bytes     | Will be 0 for RFC 6733 and 4006 AVPs or 16247 for eServ specific AVPs.                                                                                                                                                                                                                                       |
| Data       |             | As specified by the AVP code and length.                                                                                                                                                                                                                                                                     |

## AVP Data Types

The DCD can send and receive the all basic and derived data types mentioned in RFC 6733, with the exception of Float32 and Float64 which are not used by CCS.

Where the data types are used, they are encoded in complete compliance with RFC 6733 and RFC 2279.

The OctetString type can have number values as an array of either ASCII characters or integers.

# Connection Management

## Overview

### Introduction

This chapter covers the connection management compliances.

### In this chapter

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This chapter contains the following topics.

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## Introduction

### Introduction

The DCD client will both initiate and receive connections in accordance with RFC 6733 or Diameter Base Protocol Draft 8. However, the DCD will only allow connections from peers that are in its configured list. CERs from unknown peers will have a CEA message sent before the client closes the connection. The client will perform elections as specified in RFC 6733. Connections can be over either TCP or SCTP.

To manage the connections, the following messages from RFC 6733 are used:

- Capabilities Exchange Request (CER)
- Capabilities Exchange Answer (CEA)
- Device Watchdog Request (DWR)
- Device Watchdog Answer (DWA)
- Disconnect Peer Request (DPR)
- Disconnect Peer Answer (DPA)

## Capabilities Exchange Messages

### Capabilities Exchange Messages

The DCD will send both CER and CEA messages, as instructed by RFC 6733. Alternatively Diameter Base Protocol Draft 8 compliant CER and CEA messages may be exchanged if so configured.

The content of the individual fields is as follows:

| Field                          | AVP Code | Data Type                                       | Comment                                                                                                                                        |
|--------------------------------|----------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Origin-Host                    | 264      | DiameterIdentity                                | Set from configuration.                                                                                                                        |
| Origin-Realm                   | 296      | DiameterIdentity                                | Set from configuration.                                                                                                                        |
| Host-IP-Address                | 257      | Address (RFC 6733)<br>OR<br>IPAddress (Draft 8) | Set from configuration.                                                                                                                        |
| Vendor-ID                      | 266      | Unsigned32                                      | Set from configuration (eServ vendor ID is 16247)                                                                                              |
| Product-Name                   | 269      | UTF8String                                      | Set from configuration                                                                                                                         |
| Origin-State-Id                | 278      | Unsigned32                                      | Can be set from configuration. Due to the multiple process nature of slee_acs, this should not be set, and this AVP will then not be included. |
| Supported-Vendor-Id            | 265      | Unsigned32                                      | Not included.                                                                                                                                  |
| Auth-Application-Id            | 258      | Unsigned32                                      | Set from configuration.                                                                                                                        |
| Inband-Security-Id             | 299      | Unsigned32                                      | Set to 0 (NO_INBAND_SECURITY). Not included if Draft 8 compliance is enabled.                                                                  |
| Acct-Application-Id            | 259      | Unsigned32                                      | Set from configuration. If not set, then not included.                                                                                         |
| Vendor-Specific-Application-Id | 260      | Grouped                                         | Set from configuration. If not set, then not included.                                                                                         |
| Firmware-Revision              | 267      | Unsigned32                                      | Not included.                                                                                                                                  |
| Result-Code                    | 268      | Unsigned32                                      | Set as per RFC 6733 or Diameter Base Protocol Draft 8 if configured as such.                                                                   |
| Error-Message                  | 281      | UTF8String                                      | Human readable string, as per RFC 6733.                                                                                                        |
| Failed-AVP                     | 279      | Grouped                                         | Set as per RFC 6733.                                                                                                                           |

## Device Watchdog Messages

### Device Watchdog Messages

The DCD will send and respond to DWR message as instructed by RFC 6733.

The length of the silent interval that must precede a DWR message is configurable.

The possible fields are as follows:

| Field           | AVP Code | Data Type        | Comment                                                                                                |
|-----------------|----------|------------------|--------------------------------------------------------------------------------------------------------|
| Origin-Host     | 264      | DiameterIdentity | Set from configuration.                                                                                |
| Origin-Realm    | 296      | DiameterIdentity | Set from configuration.                                                                                |
| Origin-State-Id | 278      | Unsigned32       | Can be set from configuration. Due to the multiple process nature of slee_acs, this should not be set, |

| Field         | AVP Code | Data Type  | Comment                                                                      |
|---------------|----------|------------|------------------------------------------------------------------------------|
|               |          |            | and this AVP will then not be included.                                      |
| Result-Code   | 268      | Unsigned32 | Set as per RFC 6733 or Diameter Base Protocol Draft 8 if configured as such. |
| Error-Message | 281      | UTF8String | Human readable string, as per RFC 6733.                                      |
| Failed-AVP    | 279      | Grouped    | Set as per RFC 6733.                                                         |

## Disconnect Peer Messages

### Disconnect Peer Messages

A literal interpretation of RFC 6733 could assume that after receiving a DPR message, the client should never again attempt to reconnect the connection.

The possible fields are as follows:

| Field            | AVP Code | Data Type        | Comment                                                         |
|------------------|----------|------------------|-----------------------------------------------------------------|
| Origin-Host      | 264      | DiameterIdentity | Set from configuration. Default is hostname.                    |
| Origin-Realm     | 296      | DiameterIdentity | Set from configuration. Default is hostname                     |
| Disconnect-Cause | 273      | Enumerated       | The only cause sent by the DCD is 2, DO_NOT_WANT_TO_TALK_TO_YOU |
| Result-Code      | 268      | Unsigned32       | Set as per RFC 6733.                                            |
| Error-Message    | 281      | UTF8String       | Human readable string, as per RFC 6733.                         |
| Failed-AVP       | 279      | Grouped          | Set as per RFC 6733.                                            |

## Failover

### Copy of Failover

The DCD supports several failover models, depending on the logical distribution of subscriber accounts across billing engines. CCS allows a subscriber account (CCS "Wallet") to be in multiple realms (although only one realm is recommended). The DCD will also allow several peer connections within a single realm.

The selection of which realm when one account is in multiple realms can be via a proportional distribution, or a round-robin selection model. The selection of which peer for a realm can be via a proportional distribution, or a round-robin selection model.

If a request fails to get a response, retransmitting to another peer within the realm will be tried a configurable number of times. If this is exhausted, and the request is an INITIAL or EVENT request, then resubmitting to another realm will be tried, if one is available. Failover across a realm is only permitted once for each request.

A change in a received Origin-State-Id will never initiate failover of sessions.

Session failover behavior is only performed if permitted by the most recent CC-Session-Failover AVP received in the session. The initial behavior (until overridden by the CC-Session-Failover AVP) is configurable.

## Chapter 3

In addition to the behavior above, it is possible to group together peers into sets where only one of the peer will be used at any time. The currently active peer of a group will be the only connection opened, and will remain active until the connection fails. At that point the next peer will become active, and remain active until it fails.

# Credit Control Requests

## Overview

### Introduction

This chapter describes the mappings between INAP parameters and Diameter AVPs.

### In this chapter

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This chapter contains the following topics.

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## Introduction

### Introduction

The DCD can send both session and event based credit control requests. The type used is determined by the CCS request made of the DCD , and the CCS configuration.

To enable the maximum interoperability with billing engines, the structure of the CCRs that the client sends (and the CCAs that it expects to receive) is highly configurable. This configuration is per CCS action type requested, so not all CCRs need have the same structure.

## Non-configurable AVPs

### AVP List descriptions

The first set of AVPs in any CCR or CCA are not determined by the structure config, but rather the current CCS state and the action requested.

These AVPs are:

| AVP Name            | AVP Code | Data Type        | Comment                                                                                                     |
|---------------------|----------|------------------|-------------------------------------------------------------------------------------------------------------|
| Session-Id          | 263      | UTF8String       | Format: <i>DiameterIdentity;Unix time_t;SLEE_CallID</i><br>where the time is the time of the first request. |
| Origin-Host         | 264      | DiameterIdentity | Set from configuration                                                                                      |
| Origin-Realm        | 296      | DiameterIdentity | Set from configuration                                                                                      |
| Destination-Realm   | 283      | DiameterIdentity | From CCS configuration                                                                                      |
| Auth-Application-Id | 258      | Unsigned32       | Set from configuration                                                                                      |
| Service-Context-Id  | 461      | UTF8String       | Set from configuration                                                                                      |

| AVP Name              | AVP Code | Data Type        | Comment                                                                                                                                                      |
|-----------------------|----------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CC-Request-Type       | 416      | Enumerated       | All 4 values are used.                                                                                                                                       |
| CC-Request-Number     | 415      | Unsigned32       | Starts at 0, and consecutively incremented by each message of the session.                                                                                   |
| Destination-Host      | 293      | DiameterIdentity | Set from configuration                                                                                                                                       |
| User-Name             | 1        | UTF8String       | Not included in CCRs                                                                                                                                         |
| CC-Sub-Session-Id     | 419      | Unsigned64       | Not included in CCRs                                                                                                                                         |
| Acct-Multi-Session-Id | 50       | UTF8String       | Not included in CCRs                                                                                                                                         |
| Origin-State-Id       | 278      | Unsigned32       | Can be set from configuration. Due to the multiple process nature of <code>slee_acs</code> , this should not be set, and this AVP will then not be included. |
| Event-Timestamp       | 55       | Time             | The time of the request construction.                                                                                                                        |

## Re-Authorization Answer (RAA)

DCD can be configured to handle Re-A uthorization Request (RAR) messages. Incoming RAR messages are converted to SLEE events for upstream processing by the DIAMETER Control Agent (DCA). When DCD receives an RAA response from DCA, that message is forwarded to the requesting server. If there is no matching session, DCD responds with `DIAMETER_UNKNOWN_SESSION_ID`. If RAR support is not configured, DCD responds with `DIAMETER_COMMAND_UNSUPPORTED`.

## Structure Configurable AVPs

### Structure configurable AVPs

The AVPs following the Event-Timestamp are massively configurable. The configuration defines a tree structure of which AVPs to include, which CCS variables they represent, and how they are formatted. There is separate configuration for each CCS action involved. The CCS actions for which CCRs can be configured are:

- `ConfirmNamedEventReservation`
- `ConfirmTimeReservation`
- `DirectNamedEvent`
- `DirectTimeCharge`
- `ExtendTimeReservation`
- `GetNamedEventRates`
- `InitialTimeReservation`
- `NamedEventReservation`
- `RevokeNamedEventReservation`
- `RevokeTimeReservation`
- `WalletInfo`
- `CreateEDR`
- `WalletRecharge`

### ccsConcepts

To match an AVP to a variable in CCS, the DCD has "ccsConcepts". These can be a specific parameter of the CCS action, a general CCS variable, some of the call's context, or even an ACS profile value.

The DCD provides functionality to scale values by a factor, and also allows a mapping of one set of integers to another while reading/writing to CCS concepts. The specific formatting of the value field is quite configurable, see the *Diameter Charging Driver Technical Guide* for formatting details.

**Note:** All concepts are available to be set from Responses. The availability only refers to requests.

The complete list of CCS concepts that are available to CCRs/CCAs is:

| Concept Label                | Availability                  | Comment                                                                                                                                                                        |
|------------------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| acsCallID                    | always                        | The call ID from the SLEE                                                                                                                                                      |
| acsProductType               | always                        | The ACS product type ID                                                                                                                                                        |
| acsServiceProvider           | always                        | The ACS service provider ID                                                                                                                                                    |
| acsSubscriber                | always                        | The CCS subscriber ID                                                                                                                                                          |
| acsSubscriberReference       | always                        | The CCS subscriber number (ie their MSISDN)                                                                                                                                    |
| acsWallet                    | always                        | The CCS wallet ID (BE_WALLET.ID)                                                                                                                                               |
| acsWalletReference           | always                        | The CCS wallet Reference (the Billing System's reference to the wallet)                                                                                                        |
| acsWalletType                | always                        | The CCS wallet type. (CCS_WALLET_TYPE.ID)                                                                                                                                      |
| acsChargingDomain            | always                        | The destined billing domain (logical collection of wallets) for this request.                                                                                                  |
| acsTariffCode                | After an initial reservation. | Tariff Code string returned in the Initial Reservation Response (if present).                                                                                                  |
| acsUnnormalisedCalledNumber  | always                        | The called party number digits from the IDP, without any attempt at normalization.                                                                                             |
| acsProfile                   | always                        | An ACS profile buffer from the Call plan. If the buffer is not set, then the AVP is not included.                                                                              |
| discountMaxCharge            | After a setDiscount           | Present after a setDiscount node or a response that has the discountMaxCharge present.                                                                                         |
| discountPeriod               | After a setDiscount           | Present after a setDiscount node or a response that has the discountPeriod present.                                                                                            |
| tariffPlan                   | After a setTariffPlan         | Integer representing the tariff Plan.                                                                                                                                          |
| tariffCugName                | After a setTariffPlan         | The Closed User Group Name.                                                                                                                                                    |
| cascade                      | After a setCascade Override.  | Also can be set by previous responses. The integer ID of the cascade to apply.                                                                                                 |
| chargeInfoBalanceType        | After a chargeInfo response   | The CCS ID of the balance Type for the current balance of the Charge structure.                                                                                                |
| chargeInfoBalanceUnitType    | After a chargeInfo response   | The CCS ID of the balance Unit for the current balance of the Charge structure. This is not necessary for a ChargeInfo in a response, it can be derived from the balance type. |
| chargeInfoBalanceSystemValue | After a chargeInfo response   | The balance Unit for the current item of the Charge structure. This is in units of the system currency.                                                                        |
| chargeInfoBalanceUserValue   | After a chargeInfo response   | The balance Unit for the current item of the Charge structure. This is in units of the user's currency. Note that the system currency value is mandatory, while                |

| Concept Label                | Availability                | Comment                                                                                                                                                                                                                 |
|------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              |                             | this entry is optional.                                                                                                                                                                                                 |
| walletInfoBalanceUnitType    | After a walletInfo response | The CCS ID of the balance Unit for the current balance item of the Wallet structure. This is not necessary for a balance in a response, it can be derived from the balance type.                                        |
| walletInfoBalanceType        | After a walletInfo response | The CCS ID of the balance Type for the current balance of the Wallet structure.                                                                                                                                         |
| walletInfoBalanceSystemValue | After a walletInfo response | The balance Unit for the current item of the balance structure. This is in units of the system currency.                                                                                                                |
| walletInfoBalanceUserValue   | After a walletInfo response | The balance Unit for the current item of the balance structure. This is in units of the user's currency. Note that the system currency value is mandatory, while this entry is optional.                                |
| walletInfoBalanceExpiry      | After a walletInfo response | The expiry date (in time_t) of the current balance. The DCD handles conversion from time_t to DIAMETER times.                                                                                                           |
| walletInfoBalanceMaxCredit   | After a walletInfo response | The maximum amount of credit allowed for this subscriber.                                                                                                                                                               |
| walletInfoBalanceLimitType   | After a walletInfo response | The balances limit type: An integer representing one of: limitedPostpaid, postpaid, prepaid, singleUsePrepaid                                                                                                           |
| walletInfoBalanceExponent    | After a walletInfo response | An exponent to apply to the balance system value.                                                                                                                                                                       |
| walletInfoExpiry             | After a walletInfo response | The expiry date (in time_t) of the wallet. The DCD handles conversion from time_t to DIAMETER times.                                                                                                                    |
| walletInfoState              | After a walletInfo response | A single character representing the wallet's state. One of: 'A' = Active, 'D' = Dormant, 'F' = Frozen, 'P' = Pre-Use, 'S' = Suspended, 'T' = Terminated. Note that conversion to different representations is possible. |
| walletInfoLastAccess         | After a walletInfo response | time_t of the wallet's last access. The DCD handles conversion from time_t to DIAMETER times.                                                                                                                           |
| walletInfoActivationDate     | After a walletInfo response | time_t of the wallet's activation date. The DCD handles conversion from time_t to DIAMETER times.                                                                                                                       |
| walletInfoMaxConcurrent      | After a walletInfo response | The maximum number of concurrent users allowed for this wallet.                                                                                                                                                         |
| walletInfoSystemCurrency     | After a walletInfo response | The system currency.                                                                                                                                                                                                    |
| walletInfoUserCurrency       | After a walletInfo response | The CCS_ACCT.CURRENCY value for this wallet.                                                                                                                                                                            |
| cli                          | After a                     |                                                                                                                                                                                                                         |

| Concept Label                 | Availability                                       | Comment                                                                                                                                                        |
|-------------------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | DirectTimeCharge or InitialTimeReservation         |                                                                                                                                                                |
| destinationNumber             | After a DirectTimeCharge or InitialTimeReservation |                                                                                                                                                                |
| callerTimeZone                | After a DirectTimeCharge or InitialTimeReservation |                                                                                                                                                                |
| expectedReservationTotal      | InitialTimeReservation and ExtendTimeReservation   |                                                                                                                                                                |
| expectedReservationDelta      | InitialTimeReservation and ExtendTimeReservation   |                                                                                                                                                                |
| callDurationTotal             | Any Time Charging Action                           |                                                                                                                                                                |
| callDurationDelta             | Any Time Charging Action                           |                                                                                                                                                                |
| lowCreditBuffer               | After set from a response                          | Usually part of an initialTimeReservationResponse. Number of seconds from the end of the last good reservation period until a low credit beep should be played |
| freeCallDisposition           | After set from a response                          | Usually part of an initialTimeReservationResponse.                                                                                                             |
| singleReservation             | After set from a response                          | Usually part of an initialTimeReservationResponse.                                                                                                             |
| initialLowBalanceIndicator    | After set from a response                          | Usually part of an initialTimeReservationResponse. If present and non zero the indicated pre call warning announcement should be played to the subscriber.     |
| initialLowBalanceAnnouncement | After set from a response                          | Usually part of an initialTimeReservationResponse. The Announcement ID of the announcement to play.                                                            |
| maxCallLength                 | After set from a response                          | Usually part of an initialTimeReservationResponse.                                                                                                             |
| retrieveLCRNumbers            | After set from a response                          | Usually part of an initialTimeReservationResponse.                                                                                                             |
| validityPeriod                | After set from a response                          |                                                                                                                                                                |
| reservedLengthTotal           | After set from a response                          | Usually part of an xxxTimeReservationResponse.                                                                                                                 |

| Concept Label                | Availability                                                     | Comment                                                                               |
|------------------------------|------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| reservedLengthDelta          | After set from a response                                        | Usually part of an xxxTimeReservationResponse.                                        |
| timeReservationStatus        | After set from a response                                        | Usually part of an xxxTimeReservationResponse.                                        |
| maxSeconds                   | After set from a response                                        | Session Time left. Usually part of an xxxTimeReservationResponse.                     |
| callAnsweredTime             | ConfirmTimeReservation                                           |                                                                                       |
| confirmTimeReservationStatus | After set from a response                                        | Usually part of an confirmTimeReservationResponse.                                    |
| revokeTimeReservationStatus  | After set from a response                                        | Usually part of an revokeTimeReservationResponse.                                     |
| eventClass                   | NamedEventActions                                                | A string representing the CCS event Class.                                            |
| eventName                    | NamedEventActions                                                | A string of the CCS event name.                                                       |
| eventType                    | NamedEventActions                                                | An integer representing the type of CCS named event.                                  |
| minUnitsRequested            | NamedEventActions                                                |                                                                                       |
| maxUnitsRequested            | NamedEventActions                                                |                                                                                       |
| discountPercentage           | After a setDiscount or DirectNamedEvent or NamedEventReservation | Present after a setDiscount node or a response that has the discountPeriod present.   |
| extraInformation             |                                                                  | Usually call information for adding to Billing EDRs. Contents varies for each action. |
| ignoreBalanceLimit           | DirectNamedEvent, DirectTimeCharge, NamedEventReservation        |                                                                                       |
| numUnitsGranted              | After set from a response                                        |                                                                                       |
| numUnitsUsed                 | ConfirmNamedEventReservation                                     |                                                                                       |
| ratingPrecision              | InitialTimeReservation                                           | Integer representing one of seconds, tenths-of-a-second or hundredths-of-a-second     |
| callDate                     | DirectTimeCharge                                                 |                                                                                       |
| balanceUnitFilter            | WalletInfo                                                       | Request the billing engine to only return balances of this unit.                      |
| balanceTypeFilter            | WalletInfo                                                       | Request the billing engine to only return balances of this type.                      |

| Concept Label                          | Availability                   | Comment                                                                                                                                                                                                                                                              |
|----------------------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| setFreeform                            | always                         | The next AVP of concept "freeform" will instead use/update the concept indexed by the value of this AVP.                                                                                                                                                             |
| freeform                               | always                         | Uses/updates the concept previously defined by setFreeform.                                                                                                                                                                                                          |
| voucherInfoVoucher                     | After a VoucherRedeem response | The ID of the voucher that was redeemed (for example in the Voucher Management system). Not to be confused with voucher number as known to customer – that will normally be available as a profile variable set or captured in the control plan.                     |
| voucherInfoWalletExpiryExtension       | After a VoucherRedeem response | How much of an extension to apply to the wallet (expressed in units of time given by VoucherInfoWalletExpiryExtensionType).                                                                                                                                          |
| voucherInfoWalletExpiryExtensionType   | After a VoucherRedeem response | Specifies the unit of time referred to by the value in voucherInfoWalletExpiryExtension. Hours (0) or Months (1).                                                                                                                                                    |
| voucherInfoWalletExpiryExtensionPolicy | After a VoucherRedeem response | An enumeration that shows how the wallet expiry is to be updated by a voucher redemption:<br>best = 0<br>extend<br>extendFromToday<br>override<br>dontChange                                                                                                         |
| voucherInfoBalanceType                 | After a VoucherRedeem response | This is the ID of the CCS balance type of the current VoucherValue 'slot' in the VoucherInfo structure, obtained from the last voucher redemption.                                                                                                                   |
| voucherInfoValue                       | After a VoucherRedeem response | This is the monetary value from the current VoucherValue 'slot' in the VoucherInfo structure, obtained from the last voucher redemption.                                                                                                                             |
| voucherInfoBalanceExpiryExtension      | After a VoucherRedeem response | How much of an extension to apply to the wallet balance referred to by the current VoucherValue 'slot' in the VoucherInfo structure (expressed in units of time given by VoucherInfoBalanceExpiryExtensionType).                                                     |
| voucherInfoBalanceExpiryExtensionType  | After a VoucherRedeem response | Specifies the unit of time referred to by the voucherInfoBalanceExpiryExtension value in the current VoucherValue 'slot' of the VoucherInfo structure. Hours (0) or Months (1).                                                                                      |
| voucherInfoWalletExpiryExtensionPolicy | After a VoucherRedeem response | An enumeration that shows how the current voucher value balance expiry is to be updated by a voucher redemption: <ul style="list-style-type: none"> <li>• best = 0</li> <li>• extend</li> <li>• extendFromToday</li> <li>• override</li> <li>• dontChange</li> </ul> |
| voucherInfoNewBucket                   | After a VoucherRedeem response | States whether the money amount from the current VoucherValue 'slot' of the VoucherInfo structure                                                                                                                                                                    |

| Concept Label                   | Availability                   | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 | em response                    | should be stored in a new bucket if added to an existing one.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| voucherInfoMissingBalancePolicy | After a VoucherRedeem response | States how to handle the lack of any existing balance of this type in the wallet: <ul style="list-style-type: none"> <li>• allow = 0,</li> <li>• fail,</li> <li>• ignoreBalance</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| voucherInfoReplaceBalance       | After a VoucherRedeem response | Specifies whether or not the current voucher value replaces any existing balance of that type in the wallet.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| scpAction                       | Set after a response           | For handling CCAs only.<br>May be set based on an enumerated AVP to indicate combinations of: <ul style="list-style-type: none"> <li>• supervise (1)</li> <li>• release (2)</li> <li>• sendMessage (3)</li> <li>• playAnnouncement (4)</li> <li>• superviseWithoutControlling (5)</li> </ul> Where such an enumerated AVP exists, it may appear more than once with different values. This will result in DCD context values (booleans) being set according to each of the above names. These boolean values may be copied back into profile locations using the ContextCopy section in <b>eserv.config</b> , for the purposes of branching within control plans.<br>See <i>Diameter Charging Driver Technical Guide</i> for further details. |

## Balance structure limitations

There is a small limitation to the flexibility of AVP structures to define balances. Multiple balances are allowed for charge, wallet and voucher information, but all properties of the balance must be grouped together.

Basically, CCS must parse all information about a particular balance before parsing a different balance. So two grouped AVPs of balance value and balance type is fine, but a grouped AVP of all balance values and another grouped AVP of all balance types cannot be parsed by CCS.

This approach was established for the BalanceInfo transaction, and has been followed for the management of VoucherInfo structures, which define the proceeds from a voucher redemption. The information comprises a set of wallet information, and a recurring set of VoucherValue structures that each identify how to update a single wallet balance type. Accordingly CCS must parse all information about a particular voucher value before parsing fields from a different one.

## Configuring different types of DirectNamedEvent

This CCS action allows for highly configurable types of billing even to be triggered by the SLC. It is obviously desirable to be able to configure different AVPs for different types of DirectNamedEvent. The feature node that is used to emit a DirectNamedEvent is told what type of event it should trigger, categorized by event class (a kind of subject matter grouping) and event name. Both aspects are fully configurable in the CCS screens.

To make the DNE action more useful, its DCD implementation looks first for a request AVP named `DirectNamedEventRequest-xxx`, where `xxx` is the configured name of the CCS named event.

- If one is found, it is used to generate the outgoing AVP.
- If none is found, the code then falls back to the more general "DirectNamedEventRequest".

A similar logic applies to the processing of responses: that is, DCD looks first for `DirectNamedEventResponse-xxx`, then `DirectNamedEventResponse`.

## Result Code Mapping

### Introduction

The mapping of DIAMETER result codes to CCS node responses is not configurable, and depends on the CCS Action involved.

### Initial time reservation

This table lists the mapped responses for initial time reservation.

| DIAMETER Result Code                   | InitialTimeReservationResponse |
|----------------------------------------|--------------------------------|
| DIAMETER_SUCCESS                       | success                        |
| DIAMETER_LIMITED_SUCCESS               | success                        |
| DIAMETER_UNABLE_TO_DELIVER             | declineCommunicationError      |
| DIAMETER_CREDIT_LIMIT_REACHED          | declineInsufficientFunds       |
| DIAMETER_USER_UNKNOWN                  | declineUnknownWallet           |
| DIAMETER_END_USER_SERVICE_DENIED       | declineCallRestricted          |
| DIAMETER_CREDIT_CONTROL_NOT_APPLICABLE | freecall                       |
| DIAMETER_RATING_FAILED                 | declineSystemError             |
| all others                             | declineSystemError             |

### Extend time reservation

This table lists the mapped responses for extend time reservation.

| DIAMETER Result Code                   | InitialTimeReservationResponse |
|----------------------------------------|--------------------------------|
| DIAMETER_SUCCESS                       | success                        |
| DIAMETER_LIMITED_SUCCESS               | success                        |
| DIAMETER_UNABLE_TO_DELIVER             | declineCommunicationError      |
| DIAMETER_CREDIT_LIMIT_REACHED          | declineInsufficientFunds       |
| DIAMETER_USER_UNKNOWN                  | declineUnknownWallet           |
| DIAMETER_END_USER_SERVICE_DENIED       | declineSystemError             |
| DIAMETER_CREDIT_CONTROL_NOT_APPLICABLE | freecall                       |
| DIAMETER_RATING_FAILED                 | declineSystemError             |
| all others                             | declineSystemError             |

## Confirm time reservation

This table lists the mapped responses for confirm time reservation.

| DIAMETER Result Code             | InitialTimeReservationResponse |
|----------------------------------|--------------------------------|
| DIAMETER_SUCCESS                 | success                        |
| DIAMETER_LIMITED_SUCCESS         | success                        |
| DIAMETER_UNABLE_TO_DELIVER       | declineCommunicationError      |
| DIAMETER_CREDIT_LIMIT_REACHED    | declineInsufficientFunds       |
| DIAMETER_END_USER_SERVICE_DENIED | declineWalletDisabled          |
| all others                       | declineSystemError             |

## Revoke time reservation

This table lists the mapped responses for revoke time reservation.

| DIAMETER Result Code       | InitialTimeReservationResponse |
|----------------------------|--------------------------------|
| DIAMETER_SUCCESS           | success                        |
| DIAMETER_LIMITED_SUCCESS   | success                        |
| DIAMETER_UNABLE_TO_DELIVER | declineCommunicationError      |
| all others                 | declineSystemError             |

## Named event reservation

This table lists the mapped responses for named event reservation.

| DIAMETER Result Code                   | InitialTimeReservationResponse |
|----------------------------------------|--------------------------------|
| DIAMETER_SUCCESS                       | success                        |
| DIAMETER_CREDIT_CONTROL_NOT_APPLICABLE | declineSystemError             |
| DIAMETER_CREDIT_LIMIT_REACHED          | declineInsufficientFunds       |
| DIAMETER_END_USER_SERVICE_DENIED       | declineNotAllowed              |
| all others                             | declineSystemError             |

## Confirm named event reservation

This table lists the mapped responses for confirm named event reservation.

| DIAMETER Result Code | InitialTimeReservationResponse |
|----------------------|--------------------------------|
| DIAMETER_SUCCESS     | success                        |
| all others           | declineSystemError             |

## Revoke named event reservation

This table lists the mapped responses for revoke named event reservation.

| DIAMETER Result Code | InitialTimeReservationResponse |
|----------------------|--------------------------------|
| DIAMETER_SUCCESS     | success                        |
| all others           | failed                         |

## Direct named event

This table lists the mapped responses for direct named event.

| DIAMETER Result Code             | InitialTimeReservationResponse |
|----------------------------------|--------------------------------|
| DIAMETER_SUCCESS                 | success                        |
| DIAMETER_CREDIT_LIMIT_REACHED    | declineInsufficientFunds       |
| DIAMETER_END_USER_SERVICE_DENIED | declineNotAllowed              |
| all others                       | declineSystemError             |

## Direct time charge

This table lists the mapped responses for direct time charge.

| DIAMETER Result Code | InitialTimeReservationResponse |
|----------------------|--------------------------------|
| DIAMETER_SUCCESS     | success                        |
| all others           | declineSystemError             |

## Get named event rates

This table lists the mapped responses for get named event rates.

| DIAMETER Result Code                   | InitialTimeReservationResponse |
|----------------------------------------|--------------------------------|
| DIAMETER_SUCCESS                       | success                        |
| DIAMETER_CREDIT_CONTROL_NOT_APPLICABLE | success                        |
| DIAMETER_RATING_FAILED                 | rateNotAvailable               |
| DIAMETER_END_USER_SERVICE_DENIED       | declineNotAllowed              |
| all others                             | declineSystemError             |

## Wallet Info

This table lists the mapped responses for wallet info.

| DIAMETER Result Code | InitialTimeReservationResponse |
|----------------------|--------------------------------|
| DIAMETER_SUCCESS     | success                        |
| all others           | failed                         |

## Create EDR

This table lists the mapped responses for create edr.

| DIAMETER Result Code | InitialTimeReservationResponse |
|----------------------|--------------------------------|
| DIAMETER_SUCCESS     | success                        |
| all others           | failed                         |

## Wallet recharge

This table lists the mapped responses for wallet recharge.

| DIAMETER Result Code | InitialTimeReservationResponse |
|----------------------|--------------------------------|
| DIAMETER_SUCCESS     | success                        |
| all others           | failed                         |

# Compliance Tables

## Overview

### Introduction

This chapter identifies the level of compliance to RFC 6733 and RFC 4006.

### In this chapter

This chapter contains the following topics.

|                                                   |    |
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| Compliance to RFC 6733 .....                      | 21 |
| Compliance to Diameter Base Protocol Draft 8..... | 26 |
| Compliance to RFC 4006 .....                      | 31 |
| Compliance to Ericsson SCAP .....                 | 37 |

## Compliance to RFC 6733

### Introduction - Section 1

This table lists the compliances for section 1.

| Section | Section Heading | Compliance Level | Comment |
|---------|-----------------|------------------|---------|
| 1       | Introduction    | N/A              |         |

### Protocol Overview - Section 2

This table lists the compliances for section 2.

| Section | Section Heading            | Compliance Level                               | Comment                                                                                                                             |
|---------|----------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 2       | Protocol Overview          | N/A                                            |                                                                                                                                     |
| 2.1     | Transport                  | Fully compliant TCP + SCTP supported           | TCP is selected by default.                                                                                                         |
| 2.2     | Security                   | Partially compliant IPsec through g/w function |                                                                                                                                     |
| 2.3     | Application Compliance     | Fully compliant                                |                                                                                                                                     |
| 2.4     | Application Identification | Fully compliant                                |                                                                                                                                     |
| 2.5     | Connection Management      | Fully compliant                                | Connection is established and added to pool for use by Diameter sessions. Number of connections per Charging realm is configurable. |
| 2.6     | Peers                      | N/A                                            | A list of static peers are configured using the SMS platform.                                                                       |
| 2.7     | Realm Based Routing        | Not Supported                                  | No.                                                                                                                                 |

| Section | Section Heading     | Compliance Level | Comment                                                               |
|---------|---------------------|------------------|-----------------------------------------------------------------------|
| 2.8     | Role of agents      | N/A              | Convergent Charging Controller offer a Diameter client only.          |
| 2.9     | Path Authentication | N/A              | The list of valid paths are configured using the SMS management node. |

### Headers - Section 3

This table lists the compliances for section 3.

| Section | Section Heading    | Compliance Level    | Comment                                                                                                                                         |
|---------|--------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| 3       | Headers            | Fully compliant     |                                                                                                                                                 |
| 3.1     | Command Codes      | Partially compliant | CER, CEA, DWR, DWA, DPR, DPA, RAR, RAA supported.<br>Each message may be enabled independently to allow support for various applications/peers. |
| 3.2     | ABNF Specification | Fully compliant     |                                                                                                                                                 |
| 3.3     | Naming Conventions | Fully compliant     |                                                                                                                                                 |

### Diameter AVPs - Section 4

This table lists the compliances for section 4.

| Section | Section Heading             | Compliance Level | Comment                                                                 |
|---------|-----------------------------|------------------|-------------------------------------------------------------------------|
| 4       | Diameter AVPs               | N/A              |                                                                         |
| 4.1     | AVP Header                  | Fully compliant  |                                                                         |
| 4.2     | Basic AVP Data Formats      | Fully compliant  |                                                                         |
| 4.3     | Derived AVP Data Formats    | Fully compliant  | No Convergent Charging Controller specific AVPs are defined by default. |
| 4.4     | Grouped AVP Values          | Fully compliant  |                                                                         |
| 4.5     | Diameter Base Protocol AVPs | Fully compliant  | Support for all AVPs needed for compliance to section 3.1               |

### Diameter Peers - Section 5

This table lists the compliances for section 6.

| Section | Section Heading     | Compliance Level | Comment                                                                                                                                                            |
|---------|---------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5       | Diameter Peers      | N/A              |                                                                                                                                                                    |
| 5.1     | Peer Connections    | Fully compliant  | Multiple peers per realm are supported – where 2 peers are defined primary/secondary is assumed. For multiple peers load sharing is based on round-robin approach. |
| 5.2     | Peer discovery      | Non compliant    | The list of valid paths are configured using the SMS management node                                                                                               |
| 5.3     | Capability Exchange | Fully compliant  |                                                                                                                                                                    |
| 5.4     | Disconnecting Peer  | Fully compliant  | Supported non-persistently per client                                                                                                                              |

| Section | Section Heading    | Compliance Level    | Comment    |
|---------|--------------------|---------------------|------------|
|         | Connections        |                     | interface. |
| 5.5     | Transport Failure  | Fully compliant     |            |
| 5.6     | Peer State Machine | Partially compliant |            |

## Diameter Message Processing - Section 6

This table lists the compliances for section 5.

| Section | Section Heading                    | Compliance Level | Comment                                                            |
|---------|------------------------------------|------------------|--------------------------------------------------------------------|
| 6       | Diameter Message Processing        |                  |                                                                    |
| 6.1     | Request Routing                    | Fully compliant  | Please note that proxy and forward are not supported               |
| 6.2     | Diameter Answer Processing         | Fully compliant  |                                                                    |
| 6.3     | Origin-Host AVP                    | Fully compliant  |                                                                    |
| 6.4     | Origin- Realm AVP                  | Fully compliant  |                                                                    |
| 6.5     | Destination-Host AVP               | Fully compliant  |                                                                    |
| 6.6     | Destination- Realm AVP             | Fully compliant  |                                                                    |
| 6.7     | Routing AVPs                       | Fully compliant  |                                                                    |
| 6.8     | Auth-Application-Id AVP            | Fully compliant  |                                                                    |
| 6.9     | Acct-Application-Id AVP            | Fully compliant  |                                                                    |
| 6.10    | Inband-Security ID AVP             | Fully compliant  |                                                                    |
| 6.11    | Vendor Specific Application-Id AVP | Fully compliant  | No Convergent Charging Controller specific AVPs are defined today. |
| 6.12    | Redirect-Host AVP                  | Non compliant    | No explicit routing supported.                                     |
| 6.13    | Redirect-Host-Usage AVP            | Non compliant    |                                                                    |
| 6.14    | Redirect-Max-Cache-Time AVP        | Non compliant    |                                                                    |

## Error Handling - Section 7

This table lists the compliances for section 7.

| Section | Section Heading          | Compliance Level | Comment                                                                           |
|---------|--------------------------|------------------|-----------------------------------------------------------------------------------|
| 7       | Error Handling           |                  |                                                                                   |
| 7.1     | Result-Code AVP          | Fully compliant  |                                                                                   |
| 7.2     | Error Bit                | Fully compliant  |                                                                                   |
| 7.3     | Error-Message ACP        | Fully compliant  |                                                                                   |
| 7.4     | Error-Reporting-Host AVP | Fully compliant  |                                                                                   |
| 7.5     | Failed-AVP AVP           | Fully compliant  | This information may be included in the ACSApplication EDR for further debugging. |
| 7.6     | Experimental Result ACP  | Fully compliant  |                                                                                   |

| Section | Section Heading              | Compliance Level | Comment |
|---------|------------------------------|------------------|---------|
| 7.7     | Experimental Result Code AVP | Fully compliant  |         |

### Diameter User Sessions - Section 8

This table lists the compliances for section 8.

| Section | Section Heading                                    | Compliance Level    | Comment                                                                                                                                                                    |
|---------|----------------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8       | Diameter User Sessions                             |                     |                                                                                                                                                                            |
| 8.1     | Authorization Session State Machine                | Non compliant       |                                                                                                                                                                            |
| 8.2     | Accounting Session State Machine                   | Partially compliant | Implements only the client side of the state machine.                                                                                                                      |
| 8.3     | Server-Initiated Re-Auth                           | Fully compliant     |                                                                                                                                                                            |
| 8.4     | Session Termination                                | Fully compliant     | When Convergent Charging Controller receive this message from an application all session in progress will released and this information will be included in EDRs produced. |
| 8.5     | Abort Session                                      | Fully compliant     | When Convergent Charging Controller receive this message from an application all session in progress will released and this information will be included in EDRs produced. |
| 8.6     | Inferring Session Termination from Origin-State-Id | Non compliant       |                                                                                                                                                                            |
| 8.7     | Auth-Request-Type AVP                              | Non compliant       |                                                                                                                                                                            |
| 8.8     | Session-Id AVP                                     | Fully compliant     |                                                                                                                                                                            |
| 8.9     | Authorization-Lifetime AVP                         | Non compliant       |                                                                                                                                                                            |
| 8.10    | Auth-Grace-Period AVP                              | Non compliant       |                                                                                                                                                                            |
| 8.11    | Auth-Session-State AVP                             | Non compliant       |                                                                                                                                                                            |
| 8.12    | Re-Auth-Request-Type AVP                           | Non compliant       |                                                                                                                                                                            |
| 8.13    | Session Timeout AVP                                | Fully compliant     |                                                                                                                                                                            |
| 8.14    | User Name AVP                                      | Fully compliant     |                                                                                                                                                                            |
| 8.15    | Termination Cause                                  | Fully compliant     |                                                                                                                                                                            |
| 8.16    | Origin State ID AVP                                | Fully compliant     |                                                                                                                                                                            |
| 8.17    | Session Binding AVP                                | Non compliant       |                                                                                                                                                                            |
| 8.18    | Session-Server-Failover AVP                        | Non compliant       |                                                                                                                                                                            |
| 8.19    | Multi-Round-Time-Out AVP                           | Non compliant       |                                                                                                                                                                            |

| Section | Section Heading     | Compliance Level | Comment |
|---------|---------------------|------------------|---------|
| 8.20    | Class AVP           | Non compliant    |         |
| 8.21    | Event Timestamp AVP | Fully compliant  |         |

### Accounting - Section 9

This table lists the compliances for section 9.

| Section | Section Heading                   | Compliance Level    | Comment                                                                                   |
|---------|-----------------------------------|---------------------|-------------------------------------------------------------------------------------------|
| 9       | Accounting                        |                     |                                                                                           |
| 9.1     | Server Directed Model             | Fully compliant     |                                                                                           |
| 9.2     | Protocol Messages                 | Partially compliant | No IP compression is supported at this time. Support for negotiation is however provided. |
| 9.3     | Application document requirements | Fully compliant     | See Credit Control Application defined in RFC 4006                                        |
| 9.4     | Fault Resilience                  | Fully compliant     | Please note that only the client side is implemented.                                     |
| 9.5     | Accounting Records                | Fully compliant     |                                                                                           |
| 9.6     | Correlation of Accounting Records | Fully compliant     |                                                                                           |
| 9.7     | Accounting Command-Codes          | Fully compliant     |                                                                                           |
| 9.8     | Accounting AVPs                   | Fully compliant     |                                                                                           |

### AVP Occurrence Table - Section 10

This table lists the compliances for section 10.

| Section | Section Heading      | Compliance Level  | Comment                                                                                         |
|---------|----------------------|-------------------|-------------------------------------------------------------------------------------------------|
| 10      | AVP Occurrence Table | Partial compliant | As detailed elsewhere in this document and as needed for CER, CEA, DWR, DWA, DPR, DPA, RAR, RAA |

### IANA Considerations - Section 11

This table lists the compliances for section 11.

| Section | Section Heading     | Compliance Level | Comment                                                                                                                              |
|---------|---------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 11      | IANA Considerations |                  |                                                                                                                                      |
| 11.1    | AVP Header          | Fully compliant  |                                                                                                                                      |
| 11.2    | Diameter Header     | Fully compliant  |                                                                                                                                      |
| 11.3    | AVP Values          | Fully compliant  | As detailed elsewhere in this document and as needed for CER, CEA, DWR, DWA, DPR, DPA, RAR, RAA.<br>Please note that unused AVPs are |

| Section | Section Heading                   | Compliance Level | Comment                                                              |
|---------|-----------------------------------|------------------|----------------------------------------------------------------------|
|         |                                   |                  | ignored by the Convergent Charging Controller client implementation. |
| 11.4    | Diameter TCP/SCTP Port Numbers    | Fully compliant  |                                                                      |
| 11.5    | SCTP Payload Protocol Identifiers | Fully compliant  |                                                                      |
| 11.6    | NAPR Service Fields               | Fully compliant  | This information is updated when the client package is installed.    |

## Diameter Protocol Related Configurable Parameters - Section 12

This table lists the compliances for section 12.

| Section | Section Heading                                   | Compliance Level  | Comment                                                                           |
|---------|---------------------------------------------------|-------------------|-----------------------------------------------------------------------------------|
| 12      | Diameter Protocol Related Configurable Parameters | Partial compliant | Only statically configured peers are supported by Convergent Charging Controller. |

## Security Considerations - Section 13

This table lists the compliances for section 13.

| Section | Section Heading         | Compliance Level | Comment |
|---------|-------------------------|------------------|---------|
| 13      | Security Considerations | Fully compliant  |         |

# Compliance to Diameter Base Protocol Draft 8

## Introduction

This section highlights compliance for the Diameter Base Protocol Draft 8 (referred to below as Draft 8), where there is variance for RFC 6733. Compliance is as per that for RFC 6733, unless stated otherwise.

**Note:** The use of Draft 8 is facilitated for compatibility with Ericsson SCAP. Stated levels of compliance only apply to the use of Draft 8, with SCAP.

## Protocol Overview - Section 2

This table lists the compliances for section 2.

| Section | RFC 6733 | Section Heading            | Compliance Level | Comment                    |
|---------|----------|----------------------------|------------------|----------------------------|
| 2.4     | 2.4      | Application Identification | Not compliant    | Not used for SCAP          |
| N/A     | 2.9      | End-to-end security        | N/A              | Not supported for Draft 8. |

## Headers - Section 3

This table lists the compliances for section 3.

| Section | RFC 6733 | Section Heading | Compliance Level | Comment                         |
|---------|----------|-----------------|------------------|---------------------------------|
| 3.0     | 3.0      | Headers         | Fully compliant  | Note T (retransmit) flag is not |

| Section | RFC 6733 | Section Heading    | Compliance Level                               | Comment                                                                                                                                                                                                                                                                                                       |
|---------|----------|--------------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |          |                    |                                                | supported in Draft 8.                                                                                                                                                                                                                                                                                         |
| 3.2     | 3.2      | ABNF Specification | Partial compliance. Errors assumed in Draft 8. | In Section 3.2 of Draft 8, the Command Code ABNF specification appears to conflict with section 3.0, with respect to the position of Vendor-Id. This is assumed to be an error in Draft 8. Similarly the definition for "qual" in section 3.2 appears to be ambiguous in Draft 8, but is clearer in RFC 6733. |

### Diameter AVPs - Section 4

This table lists the compliances for section 4.

| Section | RFC 6733 | Section Heading             | Compliance Level    | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------|----------|-----------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.4     | 4.3      | Derived AVP Data Formats    | Fully compliant     | IPAddress in Draft 8 is replaced by Address in RFC 6733. Address represents the address type, which contains an Address Family. This is as opposed to Draft 8 which determines the type of address based on the AVP length.<br><br>The Draft 8 definition for Diameter-Identity conflicts with RFC 6733, which has both Diameter-Identity (sometimes referred to as DiameterIdentity) and DiameterURI. Effectively the Draft 8 Diameter-Identity appears to match DiameterURI in RFC 6733. This is specified as a UTF8 String. |
| 4.6     | 4.5      | Diameter Base Protocol AVPs | Partially compliant | Acct-Application-Id and Auth-Application-Id Draft 8, are specified Integer32 rather than Unsigned32. This is assumed to be a mistake as this conflicts with other sections within Draft 8 (that is, Section 6).<br><br>Destination-Realm and Origin-Realm, are specified as type UTF8String in Draft 8. However in RFC 6733 they are specified as type                                                                                                                                                                         |

| Section | RFC 6733 | Section Heading | Compliance Level | Comment                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------|----------|-----------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |          |                 |                  | <p>DiameterIdentity.<br/>Host-IP-Address is missing from the list of Diameter Base Protocol AVPs for Draft 8. This is assumed to be an error as they are present in RFC 6733.</p> <p>The AVP header flags for the Product-Name AVP differ.<br/>For Error-Message (281) OctetString is used for Draft 8, instead of UTF8String.<br/>For Error-Reporting-Host (294), UTF8String is used instead vs. DiameterIdentity</p> |

### Diameter Peers - Section 5

This table lists the compliances for section 6.

| Section | RFC 6733 | Section Heading                 | Compliance Level     | Comment                                                                                                                                                                |
|---------|----------|---------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5.1     | 5.1      | Peer Connections                | Partially compliant. | It is assumed that the "not invoke" versus "invoked" difference in section 5.1 is a correction to an existing mistake.                                                 |
| 5.3.1   | 5.3.1    | Capabilities Exchange - Request | Fully compliant      | <p>Inband-Security-Id (AVP code 299), is not supported by Draft 8.</p> <p>Similarly<br/>DIAMETER_NO_COMMON_SECURITY, is not supported in Draft 8 as a Result-Code.</p> |
| 5.3.2   | 5.3.2    | Capabilities Exchange - Answer  | Partially compliant  | In Draft 8 Vendor-Specific-Application-Id, is shown as NOT grouped in CEA (but it is in CER). This lack of grouping in CEA is assumed to be a mistake.                 |
| 5.3.5   | 5.3.5    | Host-IP-Address AVP             | Fully compliant      | Host-IP-Address (257), is specified as an IPAddress type in Draft 8, but an Address in RFC 6733.                                                                       |

| Section | RFC 6733 | Section Heading      | Compliance Level    | Comment                                                                                                                                                                                                                                                                             |
|---------|----------|----------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5.4.3   | 5.4.3    | Disconnect-Cause AVP | Partially compliant | Disconnect-Cause AVP, only features the value ELECTION_LOST in Draft 8. In RFC 6733, this is handled via the Result-Code AVP instead.<br><br>As per SCAP Programmer's Guide, "CCN acts as a Diameter SCAP Server and does not initiate connections". Hence this is not implemented. |
| 5.6     | 5.6      | Peer State Machine   | Partially compliant | There is no I-snd-DWR in section 5.6 of Draft 3588. This is not deemed to be an issue as R-snd-DWR from the peer will ensure connection is kept alive.                                                                                                                              |

### Diameter Message Processing - Section 6

This table lists the compliances for section 5.

| Section | RFC 6733 | Section Heading       | Compliance Level | Comment                                                                                                                                           |
|---------|----------|-----------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.6     | 6.6      | Destination-Realm AVP | Fully compliant  | Destination-Realm and Origin-Realm, are specified as type UTF8String in Draft 8. However in RFC 6733 they are specified as type DiameterIdentity. |

### Error Handling - Section 7

This table lists the compliances for section 7.

| Section | RFC 6733 | Section Heading | Compliance Level    | Comment                                                                                                                                                                                                                                                                                                        |
|---------|----------|-----------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7.1.3   | 7.1.3    | Protocol Errors | Partially compliant | For Draft 8 Result-Codes 5011 through to 5017, subtract 1 to get the equivalent in RFC 6733, that is, DIAMETER_NO_COMMON_APPLICATION is 5011 for Draft 8 and 5010 for RFC 6733.<br><br>In RFC 6733, a Result-Code of 5017 is DIAMETER_NO_COMMON_SECURITY.<br><br>DIAMETER_UNSUPPORTED_TRANSFORM is not present |

| Section | RFC 6733 | Section Heading | Compliance Level | Comment                                                                                                        |
|---------|----------|-----------------|------------------|----------------------------------------------------------------------------------------------------------------|
|         |          |                 |                  | in RFC 6733, and is unused by DCD. However given that a CMS-Data AVP is not expected, this is not implemented. |

### Diameter User Sessions - Section 8

This table lists the compliances for section 8.

| Section | RFC 6733 | Section Heading | Compliance Level | Comment                                                                                                                                                                               |
|---------|----------|-----------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8.8     | 8.8      | Session-Id AVP  | Fully compliant  | <p><b>Note:</b> According to section 8.8 Draft 8, Session-Id must start with DiameterIdentity.</p> <p>This is not enforced, but may be specified appropriately via configuration.</p> |

### Accounting - Section 9

This table lists the compliances for section 9.

| Section     | RFC 6733    | Section Heading    | Compliance Level    | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------|-------------|--------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9.7 and 9.8 | 9.7 and 9.8 | Accounting-Request | Partially compliant | <p>The SCAP version of the ACR message is assumed to take precedence to Draft 8.</p> <p><b>Note:</b> The Draft 8 Accounting-Interim-Interval (AVP Code 482), is replaced by Acct-Interim-Interval (85) in RFC 6733. If required this can be configured, according to a profile or a static value. However this optional is generally not used.</p> <p>A number of (optional) AVPs are changed between Draft 8, RFC 6733 and SCAP Programmer's Guide. Due to the configurable nature of DCD this should not cause too many issues. That is:</p> <p>Accounting-Radius-Session-Id Draft 8 is not in RFC 6733 but is in SCAP Programmer's Guide. This is replaced by Acct-Session-Id in RFC 6733.</p> |

## AVP Occurrence Table - Section 10

This table lists the compliances for section 10.

| Section | RFC 6733 | Section Heading      | Compliance Level    | Comment                                                                                                                                                                                                                                                        |
|---------|----------|----------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10.2    | 10.2     | Accounting AVP Table | Partially compliant | In addition to above comments regarding Accounting messages, the following should be noted:<br>Termination-Cause is shown in Section 10.2 RFC 6733, but is not specified in Draft 8 or SCAP Programmer's Guide, so it is assumed that this should not be sent. |

## IANA Considerations - Section 11

This table lists the compliances for section 11.

| Section | RFC 6733 | Section Heading | Compliance Level    | Comment                                                                                                                                                          |
|---------|----------|-----------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.2.2  | 11.2.2   | Command Flags   | Partially compliant | Byte ordering is incorrect compared to other parts of the document and RFC 6733. It is assumed that the bits specified and byte order should be as per RFC 6733. |

## Compliance to RFC 4006

### Introduction - Section 1

This table lists the compliances for sections 4.2 and 4.3 of the "Programmer's Guide - Service Charging Based on Diameter Charging Control Node 5.

| Section | Section Heading                           | Compliance Level    | Comment                                       |
|---------|-------------------------------------------|---------------------|-----------------------------------------------|
| 4.2.1   | Messages                                  | Fully compliant     |                                               |
| 4.2.2   | Diameter Base Protocol AVPs               | Partially compliant | Refer to Draft 8 compliance above.            |
| 4.2.3   | Defined Application Specific AVPs         | Fully compliant     | Values may be set according to configuration. |
| 4.2.4   | Description of Application Specific AVPs  | Fully compliant     | Values may be set according to configuration. |
| 4.3.1   | Service Charging Types                    | Fully compliant     |                                               |
| 4.3.2   | Service Charging Methods                  | Fully compliant     |                                               |
| 4.3.3   | List of Service Operations with Scenarios | Fully compliant     |                                               |

## Architecture Model - Section 2

This table lists the compliances for section 2.

| Section | Section Heading    | Compliance Level  | Comment                                                |
|---------|--------------------|-------------------|--------------------------------------------------------|
| 2       | Architecture Model | Partial compliant | Authentication and Authorization messages are not used |

## Credit-Control Messages - Section 3

This table lists the compliances for section 3.

| Section | Section Heading         | Compliance Level | Comment |
|---------|-------------------------|------------------|---------|
| 3       | Credit-Control Messages | Fully compliant  |         |

## Credit-Control Application Overview - Section 4

This table lists the compliances for section 4.

| Section | Section Heading                                    | Compliance Level | Comment                                                                |
|---------|----------------------------------------------------|------------------|------------------------------------------------------------------------|
| 4       | Credit-Control Application Overview                |                  |                                                                        |
| 4.1     | Service-Specific Rating Input and Interoperability | Fully compliant  | Details of specific AVP implementation is given later in this document |

## Session Based Credit-Control - Section 5

This table lists the compliances for section 5.

| Section | Section Heading                                           | Compliance Level    | Comment                                                                                                                        |
|---------|-----------------------------------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------|
| 5       | Session Based Credit-Control                              |                     |                                                                                                                                |
| 5.1.1   | Basic Tariff-Time Change Support                          | Non compliant       |                                                                                                                                |
| 5.1.2   | Credit Control for Multiple Services within a Sub Session | Non compliant       |                                                                                                                                |
| 5.2     | First Interrogation                                       | Fully compliant     |                                                                                                                                |
| 5.3     | Intermediate Interrogation                                | Fully compliant     |                                                                                                                                |
| 5.4     | Final Interrogation                                       | Fully compliant     |                                                                                                                                |
| 5.5     | Server-Initiated Credit Re-Authorization                  | Partially compliant | DCA support RAR at all (sub)sessions granularity.                                                                              |
| 5.6     | Graceful Service Termination                              | Fully compliant     | Please note that if this information is not present from the Billing Server no post credit expiration behavior may be defined. |
| 5.7     | Failure Procedures                                        | Fully compliant     | Please note that if this information is not present from the Billing Server normal Billing Failure Treatment may be            |

| Section | Section Heading | Compliance Level | Comment                                                   |
|---------|-----------------|------------------|-----------------------------------------------------------|
|         |                 |                  | applied inside the Convergent Charging Controller system. |

### One Time Event - Section 6

This table lists the compliances for section 6.

| Section | Section Heading       | Compliance Level | Comment                                  |
|---------|-----------------------|------------------|------------------------------------------|
| 6       | One Time Event        |                  |                                          |
| 6.1     | Service Price Enquiry | Fully compliant  |                                          |
| 6.2     | Balance Check         | Fully compliant  |                                          |
| 6.3     | Direct Debit          | Fully compliant  |                                          |
| 6.4     | Refund                | Fully compliant  |                                          |
| 6.5     | Failure Procedure     | Fully compliant  | The number of retries may be configured. |

### Credit-Control State Machine - Section 7

This table lists the compliances for section 7.

| Section | Section Heading              | Compliance Level | Comment                         |
|---------|------------------------------|------------------|---------------------------------|
| 7       | Credit-Control State Machine | Fully compliant  | Client side only is implemented |

### Credit-Control AVPs - Section 8

This table lists the compliances for section 8.

| Section | Section Heading          | Compliance Level | Comment                                                                                                                                                                                     |
|---------|--------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8       | Credit-Control AVPs      |                  |                                                                                                                                                                                             |
| 8.1     | CC-Correlation-ID AVP    | Fully compliant  | This field contains the unique identifier extracted from the session control protocol (that is, Call Reference from CAP). It is expected that this field be included in the BE EDR created. |
| 8.2     | CC-Request-Number AVP    | Fully compliant  | Implemented as per suggestion in RFC 4006.                                                                                                                                                  |
| 8.3     | CC-Request-Type AVP      | Fully compliant  |                                                                                                                                                                                             |
| 8.4     | CC-Session-Failover AVP  | Fully compliant  | This parameter may be configured to allow/reject support for session failover.                                                                                                              |
| 8.5     | CC-Sub-Session-Id AVP    | Non compliant    |                                                                                                                                                                                             |
| 8.6     | Check-Balance-Result AVP | Fully compliant  |                                                                                                                                                                                             |
| 8.7     | Cost-Information AVP     | Fully compliant  | Please note that current balance information may be requested via this                                                                                                                      |

| Section | Section Heading                      | Compliance Level | Comment                                                                                                                                                                                                                                                                       |
|---------|--------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                                      |                  | AVP group where Balance Check is requested with the Service-Identifier value set to 'Information'.                                                                                                                                                                            |
| 8.8     | Unit Value                           | Fully compliant  |                                                                                                                                                                                                                                                                               |
| 8.9     | Exponent AVP                         | Fully compliant  |                                                                                                                                                                                                                                                                               |
| 8.10    | Value Digits AVP                     | Fully compliant  |                                                                                                                                                                                                                                                                               |
| 8.11    | Currency-Code AVP                    | Fully compliant  |                                                                                                                                                                                                                                                                               |
| 8.12    | Cost-Unit AVP                        | Fully compliant  | This value may be stored for SMS notification.                                                                                                                                                                                                                                |
| 8.13    | Credit-Control AVP                   | Fully compliant  |                                                                                                                                                                                                                                                                               |
| 8.14    | Credit-Control-Failure-Handling AVP  | Fully compliant  |                                                                                                                                                                                                                                                                               |
| 8.15    | Direct-Debit-Failure-Handling        | Fully compliant  |                                                                                                                                                                                                                                                                               |
| 8.16    | Multiple-Services-Credit-Control AVP | Non compliant    | Each session relates to only one network session.                                                                                                                                                                                                                             |
| 8.17    | Granted-Service-Unit AVP             | Fully compliant  |                                                                                                                                                                                                                                                                               |
| 8.18    | Requested-Service-Unit AVP           | Fully compliant  | Convergent Charging Controller implement Time, Money, Total Octets and CC-Service-Specific-Units only today.                                                                                                                                                                  |
| 8.19    | Used-Service-Unit ACP                | Fully compliant  |                                                                                                                                                                                                                                                                               |
| 8.20    | Tariff-Time-Change AVP               | Non compliant    |                                                                                                                                                                                                                                                                               |
| 8.21    | CC-Time AVP                          | Fully compliant  |                                                                                                                                                                                                                                                                               |
| 8.22    | CC-Money AVP                         | Fully compliant  |                                                                                                                                                                                                                                                                               |
| 8.23    | CC-Total-Octets AVP                  | Fully compliant  |                                                                                                                                                                                                                                                                               |
| 8.24    | CC-Input-Octets ACP                  | Non compliant    |                                                                                                                                                                                                                                                                               |
| 8.25    | CC-Output-Octets ACP                 | Non compliant    |                                                                                                                                                                                                                                                                               |
| 8.26    | CC-Service-Specific-Units AVP        | Fully compliant  |                                                                                                                                                                                                                                                                               |
| 8.27    | Tariff-Change-Usage AVP              | Non compliant    |                                                                                                                                                                                                                                                                               |
| 8.28    | Service-Identifier AVP               | Fully compliant  | This AVP may contain the special value 'Information' if a balance query is performed. Otherwise, this value is configured to be the CCS Capability as configured on the SLC for this particular interaction. Examples include 'MO Voice', 'MT Voice', 'MO SMS', and the rest. |
| 8.29    | Rating-Group AVP                     | Fully compliant  |                                                                                                                                                                                                                                                                               |
| 8.30    | G-S-U Pool Reference AVP             | Non compliant    |                                                                                                                                                                                                                                                                               |
| 8.31    | G-S-U Pool Identifier AVP            | Non compliant    |                                                                                                                                                                                                                                                                               |
| 8.32    | CC-Unit-Type AVP                     | Fully compliant  |                                                                                                                                                                                                                                                                               |

| Section | Section Heading                 | Compliance Level    | Comment                                                                                                                                                                                                                                                   |
|---------|---------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8.33    | Validity-Time AVP               | Fully compliant     |                                                                                                                                                                                                                                                           |
| 8.34    | Final-Unit-Indication AVP       | Partially compliant | Only Final-Unit-Indication of TERMINATE is supported.                                                                                                                                                                                                     |
| 8.35    | Final-Unit-Action AVP           | Partially compliant | Only Final-Unit-Action of TERMINATE is supported.                                                                                                                                                                                                         |
| 8.36    | Restriction-Filter-Rule AVP     | Non compliant       | These rules are defined using the ACS Control Plan Editor.                                                                                                                                                                                                |
| 8.37    | Redirect-Server AVP             | Non compliant       |                                                                                                                                                                                                                                                           |
| 8.38    | Redirect-Address-Type AVP       | Fully compliant     |                                                                                                                                                                                                                                                           |
| 8.39    | Redirect-Server-Address AVP     | Fully compliant     |                                                                                                                                                                                                                                                           |
| 8.40    | Multiple-Services-Indicator AVP | Fully compliant     | Please note that multiple services are not requested by the client.                                                                                                                                                                                       |
| 8.41    | Requested-Action AVP            | Fully compliant     | This AVP may contain the special value '5' (VIEW_BALANCE) if the DIAMETER.DomainTypes.balanceEnquiry parameter is set to 'reqActionViewBalance'. The default value for balance queries is '2' (CHECK_BALANCE) when the parameter value is 'balanceCheck'. |
| 8.42    | Service-Context-Id AVP          | Fully compliant     |                                                                                                                                                                                                                                                           |
| 8.43    | Service-Parameter-Info AVP      | Fully compliant     | This parameter is used to indicate supplementary rating information toward the BE. Only a single value is sent in this group. It is expected that the BE will use this value when determining the rate for the interaction.                               |
| 8.44    | Service-Parameter-Type AVP      | Fully compliant     |                                                                                                                                                                                                                                                           |
| 8.45    | Service-Parameter-Value AVP     | Fully compliant     |                                                                                                                                                                                                                                                           |
| 8.46    | Subscription-Id AVP             | Fully compliant     |                                                                                                                                                                                                                                                           |
| 8.47    | Subscription-Id-Type AVP        | Fully compliant     | E164 and SIP URI.                                                                                                                                                                                                                                         |
| 8.48    | Subscription-Id-Data AVP        | Fully compliant     |                                                                                                                                                                                                                                                           |
| 8.49    | User-Equipment-Info AVP         | Non compliant       |                                                                                                                                                                                                                                                           |
| 8.50    | User-Equipment-Info-Type AVP    | Non compliant       |                                                                                                                                                                                                                                                           |
| 8.51    | User-Equipment-Info-Data AVP    | Non compliant       |                                                                                                                                                                                                                                                           |

### Result Code AVP Values - Section 9

This table lists the compliances for section 9.

| Section | Section Heading        | Compliance Level | Comment |
|---------|------------------------|------------------|---------|
| 9       | Result Code AVP Values |                  |         |
| 9.1     | Transient Failures     | Fully compliant  |         |
| 9.2     | Permanent Failures     | Fully compliant  |         |

### AVP Occurrence Table - Section 10

This table lists the compliances for section 10.

| Section | Section Heading                  | Compliance Level | Comment |
|---------|----------------------------------|------------------|---------|
| 10      | AVP Occurrence Table             |                  |         |
| 10.1    | Credit-Control AVP Table         | Fully compliant  |         |
| 10.2    | Re-Auth-Request/Answer Table AVP | Fully compliant  |         |

### RADIUS/Diameter Credit-Control Interworking Model - Section 11

This table lists the compliances for section 11.

| Section | Section Heading                                   | Compliance Level | Comment |
|---------|---------------------------------------------------|------------------|---------|
| 11      | RADIUS/Diameter Credit-Control Interworking Model | Non compliant    |         |

### IANA Considerations - Section 12

This table lists the compliances for section 12.

| Section | Section Heading     | Compliance Level | Comment |
|---------|---------------------|------------------|---------|
| 12      | IANA Considerations | Fully compliant  |         |

### Credit-Control Application Related Parameters - Section 13

This table lists the compliances for section 13.

| Section | Section Heading                               | Compliance Level | Comment                         |
|---------|-----------------------------------------------|------------------|---------------------------------|
| 13      | Credit-Control Application Related Parameters | Fully compliant  | Tx and Tcc timers are supported |

## Security Considerations - Section 14

This table lists the compliances for section 14.

| Section | Section Heading                 | Compliance Level | Comment                                                                      |
|---------|---------------------------------|------------------|------------------------------------------------------------------------------|
| 14      | Security Considerations         | Fully compliant  |                                                                              |
| 14.1    | Direct Connection with Redirect | Non compliant    | Statically configured peers are supported by Convergent Charging Controller. |

## Compliance to Ericsson SCAP

### Overview

This section highlights compliance for to sections 4.2 and 4.3 of the "Programmer's Guide - Service Charging Based on Diameter Charging Control Node 5".

**Note:** For SCAP the use of Diameter Base Protocol Draft 8 is required.

### Compliance - Section 4

This table lists the compliances for section 1.

| Section | Section Heading | Compliance Level | Comment |
|---------|-----------------|------------------|---------|
| 1       | Introduction    | N/A              |         |



# Glossary of Terms

## AAA

Authentication, Authorization, and Accounting. Specified in Diameter RFC 3588.

## ACS

Advanced Control Services configuration platform.

## AVP

Attribute Value Pair, used in Diameter to represent properties of a particular request or answer.

## CAMEL

Customized Applications for Mobile network Enhanced Logic

This is a 3GPP (Third Generation Partnership Project) initiative to extend traditional IN services found in fixed networks into mobile networks. The architecture is similar to that of traditional IN, in that the control functions and switching functions are remote. Unlike the fixed IN environment, in mobile networks the subscriber may roam into another PLMN (Public Land Mobile Network), consequently the controlling function must interact with a switching function in a foreign network. CAMEL specifies the agreed information flows that may be passed between these networks.

## CAP

CAMEL Application Part

## CC

Country Code. Prefix identifying the country for a numeric international address.

## CCA

Credit-Control-Answer, used in Diameter by the credit-control server to acknowledge a Credit-Control-Request (CCR) from the credit-control client.

## CCR

Credit-Control-Request, used in Diameter by the credit-control client to request credit authorization from the credit-control server.

## CCS

- 1) Charging Control Services component.
- 2) Common Channel Signalling. A signalling system used in telephone networks that separates signalling information from user data.

## CEA

Peer message: Capabilities Exchange Answer

## **CER**

Peer message: Capabilities Exchange Request

## **Connection**

Transport level link between two peers, providing for multiple sessions.

## **Convergent**

Also “convergent billing”. Describes the scenario where post-paid and pre-paid calls are handed by the same service platform and the same billing system. Under strict converged billing, post-paid subscribers are essentially treated as “limited credit pre-paid”.

## **Diameter**

A feature rich AAA protocol. Utilises SCTP and TCP transports.

## **DP**

Detection Point

## **DPA**

Peer message: Disconnect Peer Answer

## **DPR**

Peer message: Disconnect Peer Request

## **DTMF**

Dual Tone Multi-Frequency - system used by touch tone telephones where one high and one low frequency, or tone, is assigned to each touch tone button on the phone.

## **DWA**

Peer message: Device Watchdog Answer

## **DWR**

Peer message: Device Watchdog Request

## **IDP**

INAP message: Initial DP (Initial Detection Point)

## **IN**

Intelligent Network

## **INAP**

Intelligent Network Application Part - a protocol offering real time communication between IN elements.

## **Initial DP**

Initial Detection Point - INAP Operation. This is the operation that is sent when the switch reaches a trigger detection point.

## **IP**

- 1) Internet Protocol
- 2) Intelligent Peripheral - This is a node in an Intelligent Network containing a Specialized Resource Function (SRF).

## **IPSec**

IP Security. Security protocol implemented at the IP layer.

## **ISDN**

Integrated Services Digital Network - set of protocols for connecting ISDN stations.

## **MO**

Mobile Originated

## **MSISDN**

Mobile Station ISDN number. Uniquely defines the mobile station as an ISDN terminal. It consists of three parts; the country code (CC), the national destination code (NDC) and the subscriber number (SN).

## **MT**

Mobile Terminated

## **Peer**

Remote machine, which for our purposes is capable of acting as a Diameter agent.

## **PLMN**

Public Land Mobile Network

## **RAA**

Session message: Re-Auth Answer

## **RADIUS**

Remote Authentication Dial-In User Service - a system of distributed security that secures remote access to networks and network services against unauthorised access.

## **RAR**

Session message: Re-Auth Request

## **SCP**

Service Control Point. Also known as SLC.

## **SCTP**

Stream Control Transmission Protocol. A transport-layer protocol analogous to the TCP or User Datagram Protocol (UDP). SCTP provides some similar services as TCP (reliable, in-sequence transport of messages with congestion control) but adds high availability.

## **Session**

Diameter exchange relating to a particular user or subscriber access to a provided service (for example, a telephone call).

## **SIP**

Session Initiation Protocol - a signaling protocol for Internet conferencing, telephony, event notification and instant messaging. (IETF)

## **SLC**

Service Logic Controller (formerly UAS).

## **SLEE**

Service Logic Execution Environment

## **SMS**

Depending on context, can be:

- Service Management System hardware platform
- Short Message Service
- Service Management System platform
- Convergent Charging Controller Service Management System application

## **SN**

Service Number

## **SRF**

Specialized Resource Function – This is a node on an IN which can connect to both the SSP and the SLC and delivers additional special resources into the call, mostly related to voice data, for example play voice announcements or collect DTMF tones from the user. Can be present on an SSP or an Intelligent Peripheral (IP).

## **SSL**

Secure Sockets Layer protocol

## **SSP**

Service Switching Point

## **TCP**

Transmission Control Protocol. This is a reliable octet streaming protocol used by the majority of applications on the Internet. It provides a connection-oriented, full-duplex, point to point service between hosts.

**TLS**

Transport Layer Security. Cryptographic protocol used to provide secure communications. Evolved from SSL.

**URI**

Uniform Resource Identifier.



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