



OMA Offline Charging Interface

Candidate Version 1.1 – 28 Jul 2009

Open Mobile Alliance
OMA-TS-Charging_Offline-V1_1-20090728-C

Use of this document is subject to all of the terms and conditions of the Use Agreement located at <http://www.openmobilealliance.org/UseAgreement.html>.

Unless this document is clearly designated as an approved specification, this document is a work in process, is not an approved Open Mobile Alliance™ specification, and is subject to revision or removal without notice.

You may use this document or any part of the document for internal or educational purposes only, provided you do not modify, edit or take out of context the information in this document in any manner. Information contained in this document may be used, at your sole risk, for any purposes. You may not use this document in any other manner without the prior written permission of the Open Mobile Alliance. The Open Mobile Alliance authorizes you to copy this document, provided that you retain all copyright and other proprietary notices contained in the original materials on any copies of the materials and that you comply strictly with these terms. This copyright permission does not constitute an endorsement of the products or services. The Open Mobile Alliance assumes no responsibility for errors or omissions in this document.

Each Open Mobile Alliance member has agreed to use reasonable endeavors to inform the Open Mobile Alliance in a timely manner of Essential IPR as it becomes aware that the Essential IPR is related to the prepared or published specification. However, the members do not have an obligation to conduct IPR searches. The declared Essential IPR is publicly available to members and non-members of the Open Mobile Alliance and may be found on the “OMA IPR Declarations” list at <http://www.openmobilealliance.org/ipr.html>. The Open Mobile Alliance has not conducted an independent IPR review of this document and the information contained herein, and makes no representations or warranties regarding third party IPR, including without limitation patents, copyrights or trade secret rights. This document may contain inventions for which you must obtain licenses from third parties before making, using or selling the inventions. Defined terms above are set forth in the schedule to the Open Mobile Alliance Application Form.

NO REPRESENTATIONS OR WARRANTIES (WHETHER EXPRESS OR IMPLIED) ARE MADE BY THE OPEN MOBILE ALLIANCE OR ANY OPEN MOBILE ALLIANCE MEMBER OR ITS AFFILIATES REGARDING ANY OF THE IPR'S REPRESENTED ON THE “OMA IPR DECLARATIONS” LIST, INCLUDING, BUT NOT LIMITED TO THE ACCURACY, COMPLETENESS, VALIDITY OR RELEVANCE OF THE INFORMATION OR WHETHER OR NOT SUCH RIGHTS ARE ESSENTIAL OR NON-ESSENTIAL.

THE OPEN MOBILE ALLIANCE IS NOT LIABLE FOR AND HEREBY DISCLAIMS ANY DIRECT, INDIRECT, PUNITIVE, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE USE OF DOCUMENTS AND THE INFORMATION CONTAINED IN THE DOCUMENTS.

© 2009 Open Mobile Alliance Ltd. All Rights Reserved.

Used with the permission of the Open Mobile Alliance Ltd. under the terms set forth above.

Contents

| | | |
|-------------|--|----|
| 1. | SCOPE | 5 |
| 2. | REFERENCES | 6 |
| 2.1 | NORMATIVE REFERENCES | 6 |
| 2.2 | INFORMATIVE REFERENCES | 6 |
| 3. | TERMINOLOGY AND CONVENTIONS | 7 |
| 3.1 | CONVENTIONS | 7 |
| 3.2 | DEFINITIONS | 7 |
| 3.3 | ABBREVIATIONS | 7 |
| 4. | INTRODUCTION | 8 |
| 5. | MESSAGES ON CH-1 | 9 |
| 6. | MESSAGE DESCRIPTIONS | 10 |
| 6.1 | CHARGING REQUEST MESSAGE | 10 |
| 6.1.1 | Event-based, and Session-based message descriptions | 13 |
| 6.1.2 | EventRequest | 13 |
| 6.1.3 | StartRequest | 13 |
| 6.1.4 | InterimRequest | 13 |
| 6.1.5 | StopRequest | 14 |
| 6.2 | CHARGING RESPONSE MESSAGE | 14 |
| 7. | FLOWS | 15 |
| 7.1 | EVENT-BASED CHARGING MODEL | 15 |
| 7.2 | SESSION-BASED CHARGING MODEL | 16 |
| 8. | BINDINGS OF OMA CH-1 INTERFACE TO PROTOCOLS | 18 |
| 8.1 | BINDING TO DIAMETER | 18 |
| 8.1.1 | Basic Principles | 18 |
| 8.1.2 | Diameter Commands used on CH-1 | 18 |
| 8.1.2.1 | Accounting Request Command | 18 |
| 8.1.2.2 | Accounting Answer Command | 19 |
| 8.1.3 | Mapping of OMA Charging Data Elements to AVPs | 19 |
| 8.1.4 | Summary of AVPs used on CH-1 | 21 |
| 8.2 | BINDING TO PARLAY X WEB SERVICES PAYMENT API | 23 |
| 8.2.1 | Basic Principles | 23 |
| 8.2.2 | Web Service Interfaces and Operations used on CH-1 | 23 |
| 8.2.3 | Mapping of OMA Charging Data Elements to Message Parts | 24 |
| APPENDIX A. | CHANGE HISTORY | 26 |
| A.1 | APPROVED VERSION HISTORY | 26 |
| A.2 | DRAFT/CANDIDATE VERSION 1.1 HISTORY | 26 |
| APPENDIX B. | STATIC CONFORMANCE REQUIREMENTS (NORMATIVE) | 27 |
| B.1 | SCR FOR THE CHARGING ENABLER USER | 27 |
| B.1.1 | Generic SCR | 27 |
| B.1.2 | SCR for Event-based Charging | 27 |
| B.1.3 | SCR for Session-based Charging | 27 |
| B.2 | SCR FOR THE CHARGING ENABLER | 27 |
| B.2.1 | Generic SCR | 27 |
| B.2.2 | SCR for Event-based Charging | 28 |
| B.2.3 | SCR for Session-based Charging | 28 |

Figures

| | |
|--------------------------|---|
| Figure 1: Messages | 9 |
|--------------------------|---|

Flows

| | |
|--|----|
| Flow 1: Event-based Offline Charging | 15 |
| Flow 2: Session-based Offline Charging | 16 |
| Flow 3: Event-based Offline Charging with Parlay X binding | 24 |

Tables

| | |
|--|----|
| Table 1: Charging Request message | 13 |
| Table 2: EventRequest..... | 13 |
| Table 3: StartRequest..... | 13 |
| Table 4: InterimRequest | 14 |
| Table 5: StopRequest..... | 14 |
| Table 6: Charging Response message | 14 |
| Table 7: Mapping to Diameter AVPs..... | 21 |
| Table 8: Summary of Diameter AVPs used on CH-1 | 23 |
| Table 9: Summary of Web Service Interfaces and Operations used on CH-1 | 24 |
| Table 10: Mapping to Parlay X message parts..... | 25 |

1. Scope

The charging architecture document [CHRG_AD] describes two different interfaces between the Charging Enabler User and the Charging Enabler: Offline charging interface (CH-1) and online charging interface (CH-2).

The scope of this document is to provide the technical specification of the CH-1 interface.

This document defines:

- The offline charging models, the logical messages, and messages types on the CH-1 interface.
- The OMA Charging Data Elements used in the logical messages with their descriptions.
- The flow of information exchanged between the Charging Enabler User and the Charging Enabler through time in different scenarios.
- Bindings of OMA CH-1 logical messages to a specific protocol (e.g. Diameter protocol) and its protocol messages.

2. References

2.1 Normative References

- [CHRG_AD] “Charging Architecture”, Open Mobile Alliance™. OMA-AD-Charging-V1_1, URL: <http://www.openmobilealliance.org/>
- [CHRG_DDS] “Charging Data”, Open Mobile Alliance™. OMA-DDS-Charging_Data-V1_0, URL: <http://www.openmobilealliance.org/>
- [CHRG_ONLINE] “OMA Online Charging Interface”, Open Mobile Alliance™. OMA-TS-Charging_Online-V1_1, URL: <http://www.openmobilealliance.org/>
- [IOPPROC] “OMA Interoperability Policy and Process”, Version 1.3, Open Mobile Alliance™, OMA-ORG-IOP_Process-V1_3-20050712, URL: <http://www.openmobilealliance.org/>
- [RFC2119] “Key words for use in RFCs to Indicate Requirement Levels”, S. Bradner, March 1997, URL: <http://www.ietf.org/rfc/rfc2119.txt>
- [RFC3588] “Diameter Base Protocol”, P. Calhoun, J. Loughney, E. Guttman, G. Zorn, J. Arkko. September 2003, URL: <http://www.ietf.org/rfc/rfc3588.txt>
- [RFC4005] “Diameter Network Access Server Application”, P. Calhoun, G. Zorn, D. Spence, D. Mitton. August 2005, URL: <http://www.ietf.org/rfc/rfc4005.txt>
- [RFC4006] “Diameter Credit-Control Application”, H. Hakala, L. Mattila, J-P. Koskinen, M. Stura, J. Loughney. August 2005, URL: <http://www.ietf.org/rfc/rfc4006.txt>
- [TS29.140] “Multimedia Messaging Service (MMS); MM10 Interface based on Diameter Protocol”, 3GPP TS29.140, URL: <http://www.3gpp.org>
- [TS29.199-6] “Open Service Access (OSA); Parlay X Web Services; Part 6: Payment” , 3GPP TS29.199-6, URL: <http://www.3gpp.org>
- [TS29.214] “Policy and Charging Control over Rx Reference Point”, 3GPP TS29.214, URL: <http://www.3gpp.org>
- [TS32.299] “Telecommunication management; Charging management; Diameter Charging Applications”, 3GPP TS32.299, URL: <http://www.3gpp.org>

2.2 Informative References

- [OMA-DICT] “Dictionary for OMA Specifications”, Open Mobile Alliance™, OMA-Dictionary, URL: <http://www.openmobilealliance.org/>

3. Terminology and Conventions

3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

For the purposes of this document, the definitions given in [OMA-DICT] apply if they are not stated below.

| | |
|------------------------------|--|
| CH-1 | Offline Charging Interface |
| CH-2 | Online Charging Interface |
| Charging Correlation | See [OMA-DICT] |
| Charging Data Element | See [OMA-DICT] |
| Charging Enabler | A set of functions that enable other OMA enablers, applications, or other resources to charge service users. |
| Charging Enabler User | A Charging Enabler User invokes and interacts with the Charging Enabler |
| Charging Event | See [OMA-DICT] |
| Charging Request | The charging information carried from the Charging Enabler User to the Charging Enabler in one interaction, typically mapped on to a protocol message or a part of it. |
| Correlation | See Charging Correlation. |
| Resource | Any component, enabler, function or application that can send, receive, and process requests. |

3.3 Abbreviations

| | |
|-------------|--|
| 3GPP | 3 rd Generation Partnership Project |
| ACA | Accounting Answer |
| ACR | Accounting Request |
| API | Application Programming Interface |
| AVP | Attribute Value Pair |
| CHRG | Charging |
| DDS | Data Definition Specification |
| OMA | Open Mobile Alliance |
| RFC | Request for Comments |
| SCR | Static Conformance Requirements |
| SI | Service Information |
| TS | Technical Specification |

4. Introduction

Offline charging is a process where charging information for resource usage is generated concurrently with usage of that resource. The charging information generated for offline charging does not have a real time effect on the service rendered nor does it affect service control.

The charging information is passed through a combination of logical charging functions that comprise the OMA Charging Enabler.

As a result of this process, charging information MAY be generated and transferred to a billing service provider e.g. for the purpose of subscriber billing, statistics etc and/or inter-operator settlement. A billing domain typically comprises post-processing systems such as the operator's billing system or billing mediation device.

The combination of the logical charging functions can be implemented by one or more physical entities.

5. Messages on CH-1

The offline charging interface supports two charging models, an Event-based charging model and a session-based charging model. In the Event-based charging model, the Charging Enabler User reports each service usage to the Charging Enabler with a single Charging Request. In the Session-based charging model, the Charging Enabler User sends several Charging Requests related to the same service usage to the Charging Enabler.

The messages in the offline charging interface are either requests or responses. Depending on the charging model, a request message reports either a one-time event (Event-based model), or a step in a series of events that correspond to a session (Session-based model). These result in four different types of request messages: EventRequest for the Event-based model, and StartRequest, InterimRequest, and StopRequest for the Session-based model (Figure 1). The type of the offline charging request is indicated by the value in OMA Charging Data Element “Request Type”.

Each request message is acknowledged by a response message, in which the value for the OMA Charging Data Element “Request Type” SHALL be the same as in the corresponding request message. The outcome of the request is indicated with a result code that SHALL be included in the corresponding response. The resulting hierarchy of messages on the CH-1 interface is illustrated in Figure 1 below.

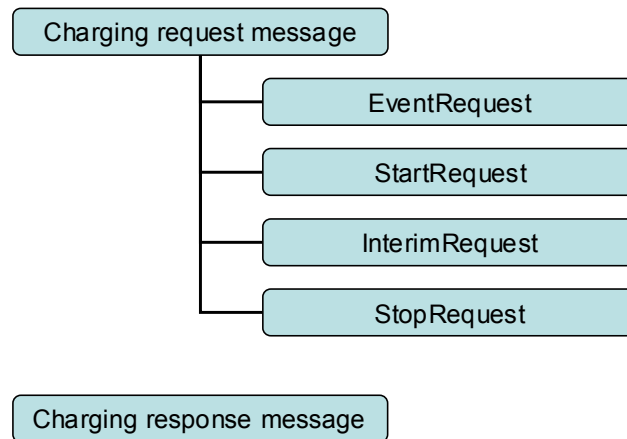


Figure 1: Messages

The request and response messages and their respective data elements are further described in Chapter 6.

The two offline charging models are described in more detail in Chapter 7. One set of flows describes the Event-based charging model, and another set describes the Session-based charging model.

6. Message Descriptions

6.1 Charging Request Message

The following table describes the data elements for the charging request message. Different request messages MAY carry different specific values in certain data elements. These specific values are described for each request type in clauses 6.1.1-5.

The “Category” column indicates whether the element is mandatory or optional.

The “Level” column allows the reader to clearly identify the hierarchy of data elements. Let’s take the example of a data element “A” (level n) followed by data elements “B” and “C” (both being on level n+1). This means that element A comprises of element B and element C.

| Level | OMA Charging Data Element | Category | Description |
|--|---------------------------|-----------|---|
| 1 | Request Type | Mandatory | This data element indicates the type of the Charging Request message. |
| 1 | Event Timestamp | Optional | This data element records the time at which the reported event occurred. |
| 1 | Service Context Id | Mandatory | This data element contains a value to identify the service/enabler specification in the context of which the charging events are interpreted. Data elements such as Service Identifier, Service Specific Units, contain service specific values that are defined within a particular service context identified in this data element. |
| Information related to OMA service usage | | | |
| 1 | Application Server Id | Optional | This data element can be used to identify the application server providing the service and/or generating the charging information. |
| 1 | Application Session Id | Optional | This data element can be used to identify the application-level session to which the charging information relates. Note that the Session Id data element identifies the charging session between a charging enabler user and a charging enabler. |
| 1 | Delivery Status | Optional | This data element can be used to carry information related to the success status of service delivery. |
| 1 | Subscription Id | Optional | This data element identifies the end user’s subscription |
| 2 | Subscription Type | Mandatory | This data element identifies which type of identifier is carried by the subscription-Id e.g.: email, MSISDN, IMSI, SIP URI... |
| 2 | Subscription Data | Mandatory | This data element identifies the end user. |
| 1 | Correlation Id | Optional | This data element contains information to correlate offline charging requests generated by different service components of the application. |
| 1 | Time | Optional | This data element indicates the length of the used time in seconds. |

| Level | OMA Charging Data Element | Category | Description |
|-------|---------------------------|-----------|---|
| 1 | Money | Optional | This data element specifies the monetary amount in the given currency. The Currency Code data element SHALL be included when this data element is included. |
| 2 | Unit Value | Mandatory | This data element describes a value for instance a monetary value. It consists of Value Digits and Exponent. |
| 3 | Value Digits | Mandatory | This data element contains the significant digits of a Unit Value without any decimal point. |
| 3 | Exponent | Optional | This data element contains the 10-x exponent that SHALL be applied to the Value Digits. |
| 2 | Currency Code | Optional | This data element specifies which currency is used in a monetary value described by the Money data element. |
| 1 | Input Octets | Optional | This data element contains the number of used octets that can be/have been received from the end user. |
| 1 | Output Octets | Optional | This data element contains the number of used octets that can be/have been sent to the end user. |
| 1 | Service Specific Units | Optional | This data element specifies the number of service-specific units (e.g., number of events, points) in a selected service. The service specific units always refer to the service identified in the Service Identifier data element |
| 1 | Service Identifier | Optional | This data element contains the identifier of a specific service within the given service context, e.g. operation type. |
| 1 | Service Key | Optional | This data element can be used to identify the particular service item delivered. |
| 1 | User Equipment Info | Optional | This data element indicates the identity and capability of the terminal the end-user is using. |
| 2 | User Equipment Info Type | Mandatory | User Equipment Info Type defines the type of user equipment information contained in User Equipment Info Value, e.g. IMEI or MAC. |
| 2 | User Equipment Info Value | Mandatory | This data element contains the identity of the user equipment. |
| 1 | Message Body | Optional | This grouped data element contains information related to content exchanged in a message. |
| 2 | Content Type | Mandatory | This data element identifies the type of content, for example using MIME types. |
| 2 | Content Length | Mandatory | This data element identifies the length of content. |
| 1 | Participant Group | Optional | This grouped data element contains information on a participant to a service-level session. |
| 2 | Called Party Address | Optional | This data element identifies an individual participant to a service-level session. |
| 1 | Role of Node | Optional | This data element can be used to identify the role of the node generating the charging event in the service event, e.g. sending, receiving, controlling and participating. |
| 1 | Role of User | Optional | This data element can be used to identify the role of the user which the charging event relates to in the service event, e.g. session owner or participant. |
| 1 | Application Service Type | Optional | This data element can be used to differentiate between the different roles of a node within service events, e.g. the sending and receiving roles of participating and |

| Level | OMA Charging Data Element | Category | Description |
|-------|--|-----------|---|
| | | | controlling functions. |
| 1 | Number Of Participants | Optional | This data element can be used to indicate the number of parties involved in the service event, e.g. participating a session. |
| 1 | Calling Party Address | Optional | This data element can be used to identify the party initiating the service event, e.g. the sender of a message. The initiating party is usually indicated in the Subscription Id data element in its role as the charged party. However, the charged party may also be some other party while the actual initiating party still needs to be identified. |
| 1 | Called Party Address | Optional | This data element can be used to identify the receiving party of a communication or the party that is the target of an operation (other than the initiator). |
| 1 | Group Name | Optional | This data element can be used to indicate the identifier of a group related to the event, e.g. a pre-defined distribution group in a messaging service. |
| 1 | Application Charging Identifier | Optional | This data element holds an identifier that enables the correlation of various records pertaining to the same session. |
| 1 | Inter-Operator Id | Optional | The IOI identifies both originating and terminating networks involved in a session/transaction. |
| 2 | Originating IOI | Mandatory | Identifies the originating network. |
| 2 | Terminating IOI | Mandatory | Identifies the terminating network. |
| 1 | Access Network Information | Optional | This data element can be used to carry information related to the access network used if available. |
| 1 | Total Number of Messages Sent | Optional | This data element can be used to indicate the number of individual messages sent by the user. However, the number does not necessarily correspond to the number of message actually delivered. |
| 1 | Total Number of Messages Exploded | Optional | This data element can be used to indicate the total number of messages exploded by the IM server. |
| 1 | Number of Messages Successfully Sent | Optional | This data element indicates the number of individual messages sent by the user that were successfully delivered to at least one recipient. |
| 1 | Number of Messages Successfully Exploded | Optional | This data element can be used to indicate the total number of messages exploded by the IM server that were successfully delivered. |
| 1 | SIP Method | Optional | This data element can be used to identify the SIP Method triggering the charging event. |
| 1 | Expires | Optional | The Expires data element indicates the relative time after which the SIP message expires. |
| 1 | Cause Code | Optional | This data element can be used to indicate the returned SIP status code for the service request. |
| 1 | SIP Request Timestamp | Optional | This data element can be used to carry a timestamp related to the start of a service delivery operation. |
| 1 | SIP Response Timestamp | Optional | This data element can be used to carry a timestamp related to the end of a service delivery operation. |
| 1 | Content ID | Optional | This data element will be used as identifier sets by the Content Provider, and unique within the DCD Service Provider's domain. |

| Level | OMA Charging Data Element | Category | Description |
|-------|---------------------------|----------|--|
| 1 | Content provider ID | Optional | This data element will be used as the globally unique identity of the content provider within the DCD Server Domain. |

Table 1: Charging Request message

6.1.1 Event-based, and Session-based message descriptions

As implied earlier in Chapter 5, in the Event-based charging model, an EventRequest is generated for a one-time event, i.e. it is not a step in a series of events that correspond to a session. Thus, the Charging Enabler User utilizes EventRequest to report each service usage to the Charging Enabler with a single charging request, independent from any other charging request (see the flow in Section 7.1).

In contrast, in the Session-based charging model, a session consists of several events that are related with each other: StartRequest, InterimRequest and StopRequest are used when the Charging Enabler User is aware that the interaction with the Charging Enabler spans over a period of time, or consists of a predictable series of events. In the Session-based charging model a charging request always consists of one StartRequest, one StopRequest, and zero or more InterimRequests in-between (see the flow in Section 7.2).

6.1.2 EventRequest

The EventRequest is used in the Event-based charging model to describe a single, distinct event.

The message structure for the EventRequest is inherited from the Charging Request message description. For data elements, where specific values exist, these are listed in Table 2 below.

| OMA Charging Data Element | Values |
|---------------------------|--------------|
| Request Type | EVENT_RECORD |
| Request Number | 0 |

Table 2: EventRequest

6.1.3 StartRequest

The StartRequest message is used in the Session-based charging model to record an event that indicates the start of a charging session. The StartRequest is the first message in a charging session.

The message structure for the StartRequest is inherited from the Charging Request message description. For data elements, where specific values exist, these are listed in Table 3 below.

| OMA Charging Data Element | Values |
|---------------------------|--------------|
| Request Type | START_RECORD |
| Request Number | 0 |

Table 3: StartRequest

6.1.4 InterimRequest

The InterimRequest is used in the Session-based charging model to record an event that is not the first or last event in a charging session. It MAY be sent on regular intervals or based on other triggers defined for the service. There MAY be multiple interim requests for the same ongoing session.

The message structure for the InterimRequest is inherited from the Charging Request message description. For data elements, where specific values exist, these are listed in Table 4 below.

| OMA Charging Data Element | Values |
|---------------------------|----------------|
| Request Type | INTERIM_RECORD |
| Request Number | n>0 |

Table 4: InterimRequest

6.1.5 StopRequest

The StopRequest is used in the Session-based charging model to record an event that indicates the end of an ongoing charging session, i.e. an event that indicates that it is the last event in that charging session.

The message structure for the StopRequest is inherited from the Charging Request message description. For data elements, where specific values exist, these are listed in Table 5 below.

| OMA Charging Data Element | Values |
|---------------------------|-------------------------------|
| Request Type | STOP_RECORD |
| Request Number | n+1 (n = last InterimRequest) |

Table 5: StopRequest

6.2 Charging Response Message

The Charging Response message is the acknowledgement message to one of the Charging Request messages described above. The type of the corresponding Charging Request message is indicated by the value of the OMA Charging Data Element "Request Type".

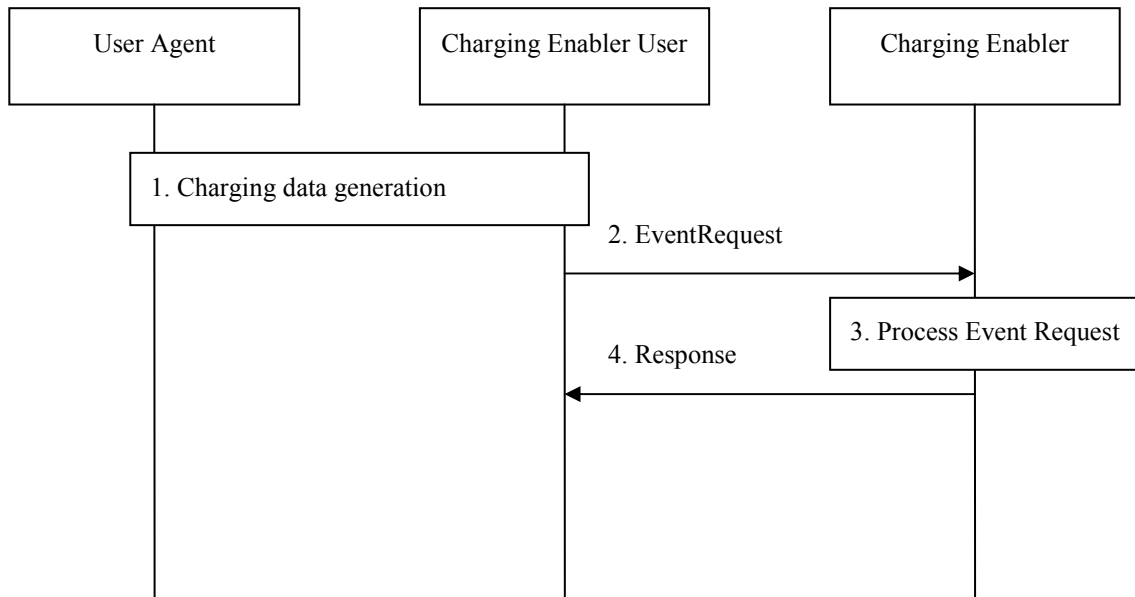
The following table defines the data elements for a Charging Response message.

| Level | OMA Charging Data Element | Category | Description |
|-------|---------------------------|-----------|---|
| 1 | Result Code | Mandatory | This data element indicates the result of a particular request. |
| 1 | Request Type | Mandatory | This data element indicates the type of the corresponding Charging request message. |
| 1 | Event Timestamp | Optional | This data element records the time at which the reported event occurred. |

Table 6: Charging Response message

7. Flows

7.1 Event-based Charging Model

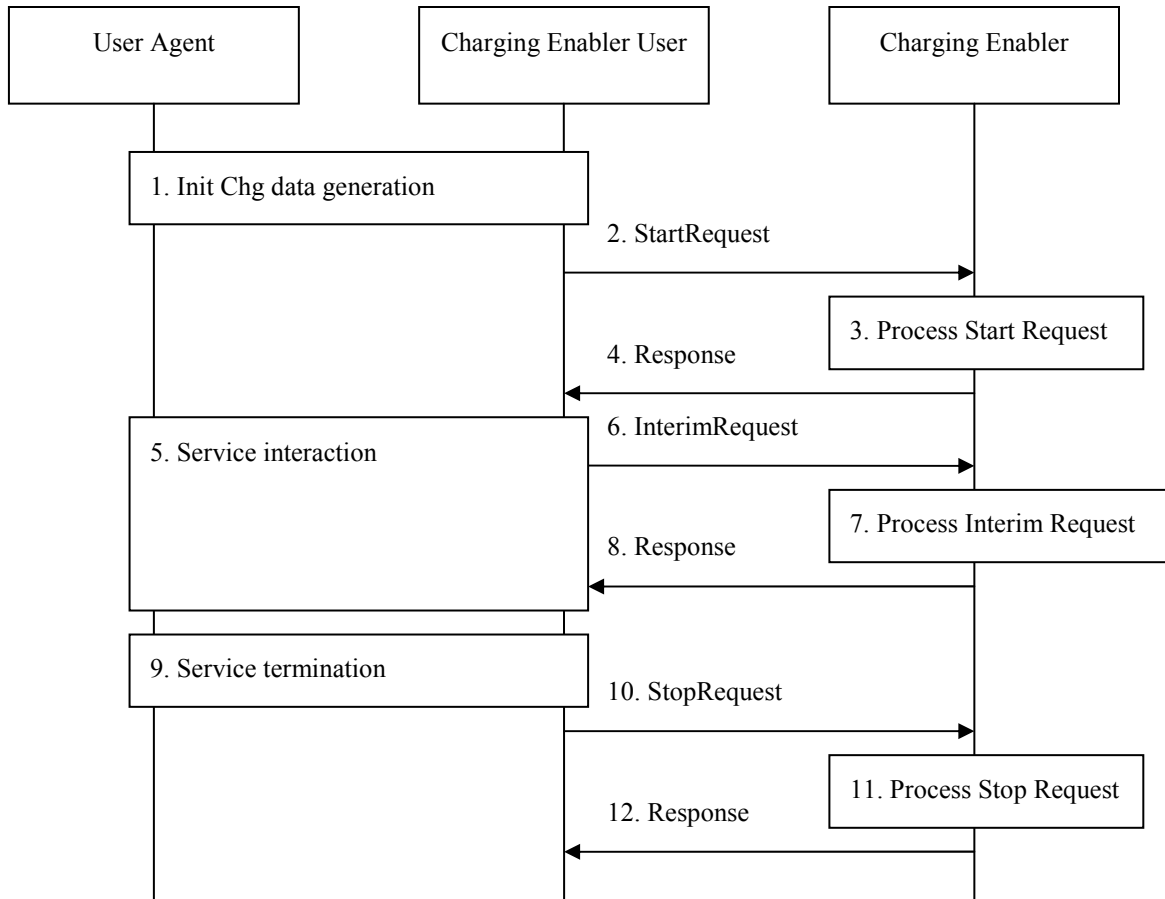


Flow 1: Event-based Offline Charging

The above flow depicts the Event-based charging model and the generation of the EventRequest message and a response to it. Here, each message sent by the Charging Enabler User towards the Charging Enabler is self contained, meaning that it contains enough information for the Charging Enabler to record a charge.

1. “**Charging Data generation**”: The user invokes a service that is supported by the Charging Enabler User, and charging data is generated.
2. “**EventRequest**”: As a result of the service usage, the Charging Enabler User invokes the CH-1 interface and calls the Charging Enabler.
3. “**Process Event Request**”: The Charging Enabler processes, and records the event
4. “**Response**”: The Charging Enabler answers the Charging Enabler User with a generated offline charging response.

7.2 Session-based Charging Model



Flow 2: Session-based Offline Charging

This is a possible flow for Session-based Offline Charging. In addition to the Event-based Offline Charging in Section 7.1, in this flow the Charging Enabler User MAY send a sequence of partial information which is then aggregated by the Charging Enabler into a final charge.

1. “**Init Chg data generation**”: the user invokes a service that is supported by the Charging Enabler User.
2. “**StartRequest**”: The Charging Enabler User invokes CH-1, and sends in the initial StartRequest a request indicating to start a logical session that is associated with the service interaction. The StartRequest charging request message MAY also convey information describing the service and identifying the subscriber.
3. “**Process Start request**”: The Charging Enabler starts the charging session, and records the event.
4. “**Response**”: The Charging Enabler responds with “received and recorded” or with information about failure.
5. “**Service Interaction**”: The subscriber is using the service.
6. “**InterimRequest**”: As the service usage proceeds, the Charging Enabler User sends the charging information it has collected so far using the CH-1 interface due to either intermediate timer expiry or charging condition changes recognized at the Charging Enabler User. The periodicity MAY be conveyed in a data element coming from the Charging Enabler. This message MAY occur zero or more times.

7. “**Process Interim request**”: The Charging Enabler processes and records the event.
8. “**Response**”: The Charging Enabler responds with “received and recorded” or with information about failure.
9. “**Service Termination**”: The subscriber decides to terminate the service.
10. “**StopRequest**”: The Charging Enabler User sends final charging information to the Charging Enabler. This message implies that the session opened by the initial StartRequest SHALL be closed.
11. “**Process Stop request**”: The Charging Enabler records the event and closes the session.
12. “**Response**”: The Charging Enabler responds with “received and recorded” or with information about failure.

8. Bindings of OMA CH-1 Interface to Protocols

This chapter describes the mapping of the OMA Charging Data Elements described in Chapter 6 to the actual protocol(s) utilized on the CH-1 interface.

8.1 Binding to Diameter

8.1.1 Basic Principles

The CH-1 interface is based on the re-use of the basic functionality of Diameter Accounting, as defined by the Diameter Base Protocol in IETF [RFC3588]. Any mandatory element of the RFC SHALL be supported.

The Charging Enabler User maps to the Diameter Client in the sense that it is the entity monitoring the service usage, generating charging data, and sending the charging requests to the Diameter Server. The client SHALL implement the accounting state machine as described in [RFC3588]. The Charging Enabler maps to the Diameter Server in the sense that it is the entity receiving and acknowledging the charging requests, and storing the charging records. The server SHALL implement the accounting state machine "SERVER, STATELESS ACCOUNTING" as specified in [RFC3588], i.e. there is no order in which the server expects to receive the accounting information.

In the definition of the Diameter Commands, the AVPs that are specified in the referenced specifications but not used by the OMA Charging Enabler are marked with strikethrough in grey, e.g. [~~Acct-Multi-Session-Id~~]. If such parameters are present, they will not constitute an error. The bracket conventions and the asterisk (*) below SHALL be used as described in [RFC3588].

8.1.2 Diameter Commands used on CH-1

On the CH-1 interface requests are sent from the Charging Enabler User to the Charging Enabler and responses are sent from the Charging Enabler to the Charging Enabler User. The Accounting Request (ACR) commands are used to communicate Event-based and Session-based requests. The Accounting Answer (ACA) commands are used to communicate Event-based and Session-based responses.

The following additional Diameter Base messages as specified in [RFC3588] SHALL also be supported by the Charging Enabler:

- Capability-Exchange-Answer (CEA);
- Device-Watchdog-Request (DWR) and Device-Watchdog-Answer (DWA);
- Disconnect-Peer-Request (DPR) and Disconnect-Peer-Answer (DPA);

and by the Charging Enabler User:

- Capability-Exchange-Request (CER);
- Device-Watchdog-Request (DWR) and Device-Watchdog-Answer (DWA);
- Disconnect-Peer-Request (DPR) and Disconnect-Peer-Answer (DPA).

8.1.2.1 Accounting Request Command

The ACR command is sent from the Charging Enabler User to the Charging Enabler in order to send charging information for the requested resource usage. This command is used for both Event-based and Session-based requests. The distinction is made accordingly to the value carried in the Accounting-Record-Type AVP: EVENT_RECORD (value 1) for an Event-based request, START_RECORD (value 2), INTERIM_RECORD (value 3) and STOP_RECORD (value 4) for a Session-based request.

The message format is the following:

```

<ACR> ::= < Diameter Header: 271, REQ, PXY >

    < Session-Id >
    { Origin-Host }
    { Origin-Realm }
    { Destination-Realm }
    { Accounting-Record-Type }
    { Accounting-Record-Number }
    [ Acct-Application-Id ]
[ Vendor-Specific-Application-Id ]
    [ User-Name ]
[ Accounting-Sub-Session-Id ]
[ Acct-Session-Id ]
[ Acct-Multi-Session-Id ]
    [ Acct-Interim-Interval ]
[ Accounting-Realtime-Required ]
    [ Origin-State-Id ]
    [ Event-Timestamp ]
* [ Proxy-Info ]
* [ Route-Record ]
    [ Service-Context-Id ]
    [ Service-Information ]
* [ AVP ]

```

8.1.2.2 Accounting Answer Command

The ACA command is sent from the Charging Enabler to the Charging Enabler User in response to an ACR command and is used in order to acknowledge the reception of the charging data. This command is used for both Event-based and Session-based responses. The distinction is made accordingly to the value carried in the Accounting-Record-Type AVP. The value of this AVP will be the same one contained in the same AVP of the corresponding request.

The message format is the following:

```

<ACA> ::= < Diameter Header: 271, PXY >

    < Session-Id >
    { Result-Code }
    { Origin-Host }
    { Origin-Realm }
    { Accounting-Record-Type }
    { Accounting-Record-Number }
    [ Acct-Application-Id ]
[ Vendor-Specific-Application-Id ]
    [ User-Name ]
[ Accounting-Sub-Session-Id ]
[ Acct-Session-Id ]
[ Acct-Multi-Session-Id ]
    [ Error-Reporting-Host ]
    [ Acct-Interim-Interval ]
[ Accounting-Realtime-Required ]
    [ Origin-State-Id ]
    [ Event-Timestamp ]
* [ Proxy-Info ]
* [ AVP ]

```

8.1.3 Mapping of OMA Charging Data Elements to AVPs

The following table describes the mapping of the OMA Charging Data Elements to the Diameter AVPs, which are re-used from [RFC3588], [RFC4005], [RFC4006] or [TS32.299]. Mapping of OMA Charging Data Elements to AVPs defined by OMA can be found from [CHRG_DDS].

| OMA Charging Data Element | Diameter AVP |
|--|--|
| Access Network Information | Access-Network-Charging-Identifier-Value |
| Input Octets | Accounting-Input-Octets |
| Output Octets | Accounting-Output-Octets |
| Request Number | Accounting-Record-Number |
| Request Type | Accounting-Record-Type |
| Time | Acct-Session-Time |
| Application Server Id | Application-Server-Id |
| Application Service Type | Application-Service-Type |
| Application Session Id | Application-Session-Id |
| Correlation Id | Billing-Information |
| Money | CC-Money |
| Service Specific Units | CC-Service-Specific-Units |
| Called Party Address | Called-Party-Address |
| Calling Party Address | Calling-Party-Address |
| Cause Code | Cause-Code |
| Content ID | Content-ID |
| Content Length | Content-Length |
| Content provider ID | Content-provider-ID |
| Content Type | Content-Type |
| Currency Code | Currency-Code |
| Delivery Status | Delivery-Status |
| Event Timestamp | Event-Timestamp |
| Expires | Expires |
| Exponent | Exponent |
| Application Charging Identifier | IMS-Charging-Identifier |
| Inter-Operator Identifier | Inter-Operator-Identifier |
| Message Body | Message-Body |
| Number of Messages Successfully Exploded | Number-of-Messages-Successfully-Exploded |
| Number of Messages Successfully Sent | Number-of-Messages-Successfully-Sent |
| Number of participants | Number-of-Participants |
| Originating IOI | Originating-IOI |
| Participant Group | Participant-Group |
| Group Name | PoC-Group-Name |
| Role of Node | PoC-Server-Role |
| Role of User | PoC-User-Role |
| Result code | Result-Code |
| Service Context Id | Service-Context-Id |
| Service Identifier | Service-Identifier |
| Service Key | Service-Key |
| SIP Method | SIP-Method |
| SIP Request Timestamp | SIP-Request-Timestamp |
| SIP Response Timestamp | SIP-Response-Timestamp |
| Subscription Id | Subscription-Id |

| OMA Charging Data Element | Diameter AVP |
|-----------------------------------|-----------------------------------|
| Subscription Data | Subscription-Id-Data |
| Subscription Type | Subscription-Id-Type |
| Terminating IOI | Terminating-IOI |
| Total Number of Messages Exploded | Total-Number-of-Messages-Exploded |
| Total Number of Messages Sent | Total-Number-of-Messages-Sent |
| Unit Value | Unit-Value |
| User Equipment Info | User-Equipment-Info |
| User Equipment Info Type | User-Equipment-Info-Type |
| User Equipment Info Value | User-Equipment-Info-Value |
| Value Digits | Value-Digits |

Table 7: Mapping to Diameter AVPs

8.1.4 Summary of AVPs used on CH-1

The following table lists the Diameter AVPs specifically re-used by OMA for the Offline Charging interface (CH-1).

The table contains the following information:

- AVP Name: The name used in Diameter.
- AVP Code: The AVP Code used in the Diameter AVP Header.
- Used in ACR: Indicates if it is mandatory, optional or not used in the ACR command.
- Used in ACA: Indicates if it is mandatory, optional or not used in the ACA command.
- Used in SI: Indicates if it is mandatory, optional or not used in the Service Information parameter.
- AVP Defined: A reference to where this AVP is defined.
- Value Type: The Diameter format of the AVP data as defined in Basic or Derived AVP Data Format.
- AVP Flag Rules: The rules for how the AVP Flags in the AVP Header may be set.
- May Encr.: Indicates if the AVP may be encrypted or not.

| AVP Name | AVP Code | Used in | | | AVP Defined | Value Type | AVP Flag Rules | | | | May Encr. |
|--|----------|---------|-----|----|-------------|-------------|----------------|-----|------------|----------|-----------|
| | | ACR | ACA | SI | | | Must | May | Should Not | Must Not | |
| Access–Network–Charging–Identifier–Value | 503 | - | - | O | [TS29.214] | OctetString | V,M | P | - | - | Y |
| Accounting–Input–Octets | 363 | - | - | O | [RFC4005] | Unsigned64 | M | P | - | V | Y |
| Accounting–Output–Octets | 364 | - | - | O | [RFC4005] | Unsigned64 | M | P | - | V | Y |
| Accounting–Record–Number | 485 | M | M | - | [RFC3588] | Unsigned32 | M | P | - | V | Y |
| Accounting–Record–Type | 480 | M | M | - | [RFC3588] | Enumerated | M | P | - | V | Y |
| Acct–Application–Id | 259 | O | O | - | [RFC3588] | Unsigned32 | M | P | - | V | N |
| Acct–Interim–Interval | 85 | O | O | - | [RFC3588] | Unsigned32 | M | P | - | V | Y |
| Acct–Session–Time | 46 | - | - | O | [RFC4005] | Unsigned32 | M | P | - | V | Y |
| Application–Server–Id | 2101 | - | - | O | [CHRG_DDS] | UTF8String | V,M | P | - | - | Y |
| Application–Service–Type | 2102 | - | - | O | [CHRG_DDS] | Enumerated | V,M | P | - | - | Y |
| Application–Session–Id | 2103 | - | - | O | [CHRG_DDS] | Unsigned32 | V,M | P | - | - | Y |

| AVP Name | AVP Code | Used in | | | AVP Defined | Value Type | AVP Flag Rules | | | | May Encr. |
|--|----------|---------|-----|----|-------------|-------------|----------------|-----|------------|----------|-----------|
| | | ACR | ACA | SI | | | Must | May | Should Not | Must Not | |
| Billing-Information | 1115 | - | - | O | [TS29.140] | UTF8String | V,M | P | - | - | Y |
| Called-Party-Address | 832 | - | - | O | [TS32.299] | UTF8String | V,M | P | - | - | N |
| Calling-Party-Address | 831 | - | - | O | [TS32.299] | UTF8String | V,M | P | - | - | N |
| Cause-Code | 861 | - | - | O | [TS32.299] | Integer32 | V,M | P | - | - | N |
| CC-Money | 413 | - | - | O | [RFC4006] | Grouped | M | P | - | V | Y |
| CC-Service-Specific-Units | 417 | - | - | O | [RFC4006] | Unsigned64 | M | P | - | V | Y |
| Content-ID | 2116 | - | - | O | [CHRG_DDS] | UTF8String | V,M | P | - | - | Y |
| Content-Length | 827 | - | - | O | [TS32.299] | Unsigned32 | V,M | P | - | - | N |
| Content-provider-ID | 2117 | - | - | O | [CHRG_DDS] | UTF8String | V,M | P | - | - | Y |
| Content-Type | 826 | - | - | O | [TS32.299] | UTF8String | V,M | P | - | - | N |
| Currency-Code | 425 | - | - | O | [RFC4006] | Unsigned32 | M | P | - | V | Y |
| Destination-Realm | 283 | M | - | - | [RFC3588] | DiamIdent | M | P | - | V | N |
| Delivery-Status | 2104 | - | - | O | [CHRG_DDS] | UTF8String | V,M | P | - | - | Y |
| Error-Reporting-Host | 294 | - | O | - | [RFC3588] | DiamIdent | - | P | - | V,M | N |
| Event-Timestamp | 55 | O | O | - | [RFC3588] | Time | M | P | - | V | N |
| Expires | 888 | - | - | O | [TS32.299] | Unsigned32 | V,M | P | - | - | N |
| Exponent | 429 | - | - | O | [RFC4006] | Integer32 | M | P | - | V | Y |
| IMS-Charging-Identifier | 841 | - | - | O | [TS32.299] | UTF8String | V,M | P | - | - | N |
| Inter-Operator-Identifier | 838 | - | - | O | [TS32.299] | Grouped | V,M | P | - | - | N |
| Message-Body | 889 | - | - | O | [TS32.299] | Grouped | V,M | P | - | - | N |
| Number-of-Messages-Successfully-Exploded | 2111 | - | - | O | [CHRG_DDS] | Unsigned32 | V,M | P | - | - | N |
| Number-of-Messages-Successfully-Sent | 2112 | - | - | O | [CHRG_DDS] | Unsigned32 | V,M | P | - | - | N |
| Number-of-Participants | 885 | - | - | O | [TS32.299] | Unsigned32 | V,M | P | - | - | N |
| Originating IOI | 839 | - | - | O | [TS32.299] | UTF8String | V,M | P | - | - | N |
| Origin-Host | 264 | M | M | - | [RFC3588] | DiamIdent | M | P | - | V | N |
| Origin-Realm | 296 | M | M | - | [RFC3588] | DiamIdent | M | P | - | V | N |
| Origin-State-Id | 278 | O | O | - | [RFC3588] | Unsigned32 | M | P | - | V | N |
| Participant-Group | 1260 | - | - | O | [TS32.299] | Grouped | V,M | P | - | - | N |
| PoC-Group-Name | 859 | - | - | O | [TS32.299] | UTF8String | V,M | P | - | - | N |
| PoC-Server-Role | 883 | - | - | O | [TS32.299] | Enumerated | V,M | P | - | - | Y |
| PoC-User-Role | 1252 | - | - | O | [TS32.299] | Grouped | V,M | P | - | - | Y |
| Proxy-Info | 284 | O | O | - | [RFC3588] | Grouped | M | - | - | P,V | N |
| Proxy-Host | 280 | M | M | - | [RFC3588] | DiamIdent | M | - | - | P,V | N |
| Proxy-State | 33 | M | M | - | [RFC3588] | OctetString | M | - | - | P,V | N |
| Result-Code | 268 | - | M | - | [RFC3588] | Unsigned32 | M | P | - | V | N |
| Route-Record | 282 | O | - | - | [RFC3588] | DiamIdent | M | - | - | P,V | N |
| Service-Context-Id | 461 | O | - | - | [RFC4006] | UTF8String | M | P | - | V | Y |
| Service-Generic-Information | 1256 | - | - | O | [TS32.299] | Grouped | V,M | P | - | - | Y |
| Service-Identifier | 439 | - | - | O | [RFC4006] | UTF8String | M | P | - | V | Y |
| Service-Information | 873 | O | - | - | [TS32.299] | Grouped | V,M | P | - | - | N |
| Service-Key | 1114 | - | - | O | [TS29.140] | UTF8String | V,M | - | - | - | Y |
| Session-Id | 263 | M | M | - | [RFC3588] | UTF8String | M | P | - | V | Y |
| SIP-Method | 824 | - | - | O | [TS32.299] | UTF8String | V,M | P | - | - | N |

| AVP Name | AVP Code | Used in | | | AVP Defined | Value Type | AVP Flag Rules | | | | May Encr. |
|-----------------------------------|----------|---------|-----|----|-------------|-------------|----------------|-----|------------|----------|-----------|
| | | ACR | ACA | SI | | | Must | May | Should Not | Must Not | |
| SIP-Request-Timestamp | 834 | - | - | O | [TS32.299] | Time | V,M | P | - | - | N |
| SIP-Response-Timestamp | 835 | - | - | O | [TS32.299] | Time | V,M | P | - | - | N |
| Subscription-Id | 443 | - | - | O | [RFC4006] | Grouped | M | P | - | V | Y |
| Subscription-Id-Data | 444 | - | - | M | [RFC4006] | UTF8String | M | P | - | V | Y |
| Subscription-Id-Type | 450 | - | - | M | [RFC4006] | Enumerated | M | P | - | V | Y |
| Terminating-IOI | 295 | - | - | O | [RFC3588] | Enumerated | V,M | P | - | - | N |
| Total-Number-Of-Messages-Exploded | 2113 | - | - | O | [CHRG_DDS] | Unsigned32 | V,M | P | - | - | Y |
| Total-Number-Of-Messages-Sent | 2114 | - | - | O | [CHRG_DDS] | Unsigned32 | V,M | P | - | - | Y |
| Unit-Value | 445 | - | - | M | [RFC4006] | Grouped | M | P | - | V | Y |
| User-Equipment-Info | 458 | - | - | O | [RFC4006] | Grouped | - | P,M | - | V | Y |
| User-Equipment-Info-Type | 459 | - | - | M | [RFC4006] | Enumerated | - | P,M | - | V | Y |
| User-Equipment-Info-Value | 460 | - | - | M | [RFC4006] | OctetString | - | P,M | - | V | Y |
| User-Name | 1 | O | O | - | [RFC3588] | UTF8String | M | P | - | V | Y |
| Value-Digits | 447 | - | - | M | [RFC4006] | Integer64 | M | P | - | V | Y |

Table 8: Summary of Diameter AVPs used on CH-1

For the usage of Service-Context-ID AVP and Service-Information AVP please refer to the [CHRG_ONLINE]. Since the application uses Acct-Application-ID, the AVP SHALL contain the value of 3 as defined in [RFC3588].

8.2 Binding to Parlay X Web Services Payment API

8.2.1 Basic Principles

This section specifies how the OMA CH-1 interface MAY be exposed as a Web Service, which is compliant with the Parlay X Web Services Payment API as specified in [TS29.199-6].

This mapping covers only part of the Charging Enabler’s functionality.

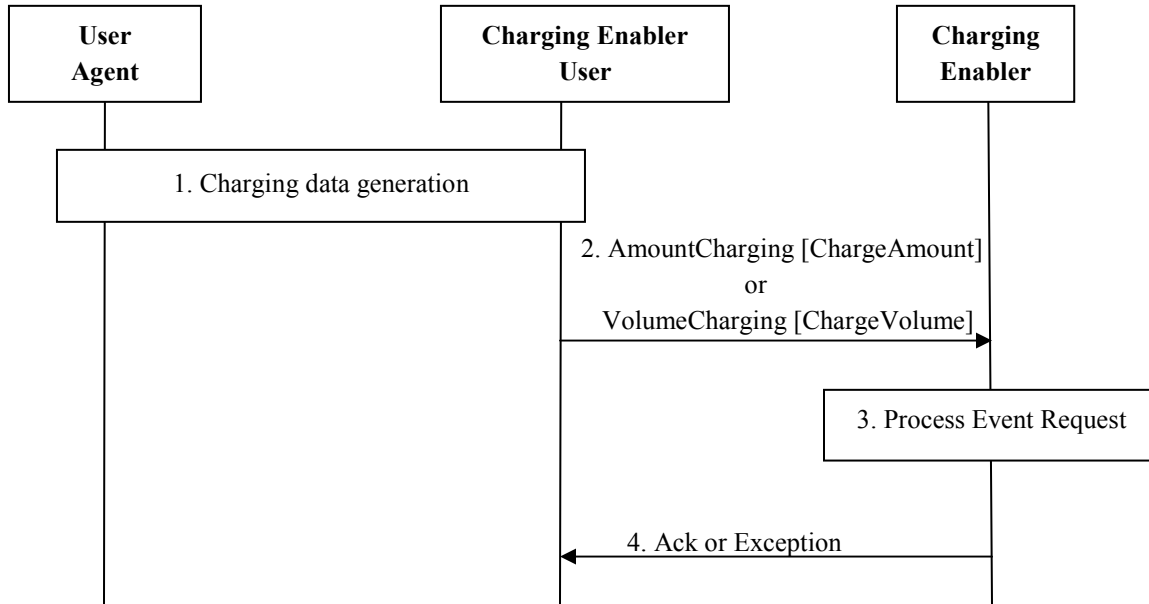
8.2.2 Web Service Interfaces and Operations used on CH-1

| Charging Enabler Message Type | Parlay X Payment API Interface/Operation |
|----------------------------------|--|
| Event Request | When decentralized rating is used: <ul style="list-style-type: none"> Interface: AmountCharging Operation: ChargeAmount Inclusion of service information except for ‘description’, ‘currency’, ‘amount’ and ‘code’ is not supported When centralized rating is used: <ul style="list-style-type: none"> Interface: VolumeCharging Operation: ChargeVolume Rating parameters and other service information may be included in the “parameters” part |
| Start Request Interim Request | Sessions for offline charging are not supported. Instead, the functionality specified in Section 7.2 can be fulfilled by using |

| | |
|--------------|-----------------------|
| Stop Request | Event-based Charging. |
|--------------|-----------------------|

Table 9: Summary of Web Service Interfaces and Operations used on CH-1

The flow diagram below clarifies the mapping of the Event-based Charging model defined in Section 7.1 to the Web Services and Operations used with the Parlay X binding.



Flow 3: Event-based Offline Charging with Parlay X binding

The steps of the Event-based Charging flow in the case of Parlay X binding are the following:

1. “**Charging data generation**”: The user invokes a service that is supported by the Charging Enabler User, and charging data is generated.
2. The Charging Enabler User sends an Event Request using either **Interface: AmountCharging, Operation: ChargeAmount** or **Interface: VolumeCharging, Operation: ChargeVolume** to the Charging Enabler.
3. “**Process Event Request**”: The Charging Enabler processes, and records the event
4. “**Ack or Exception**”: The Charging Enabler answers the Charging Enabler User with either an empty message (Charge Amount Response or Charge Volume Response) or with an exception.

8.2.3 Mapping of OMA Charging Data Elements to Message Parts

The following table lists the OMA Charging Data Elements defined in this specification and the mapping of these elements to message parts in the Parlay X Payment API messages.

As a general rule, any additional OMA Charging Data Elements created to convey charging information and listed in [CHRG_DDS] SHALL be mapped to the “parameters” part in the Parlay X Payment API messages and SHALL use a parameter name derived from the name of the corresponding OMA Charging Data Element by removing spaces and starting all words with a capital letter except for the first word, for example Service Key -> serviceKey.

| OMA Charging Data Element | Parlay X Payment API Part Name |
|---------------------------|---|
| Correlation Id | parameters:correlationId |
| Currency Code | charge:currency |
| Event Timestamp | parameters:eventTimestamp |
| Exponent | charge:amount |
| Input Octets | parameters:inputOctets |
| Money | charge:amount |
| Output Octets | parameters:outputOctets |
| Request Number | NOT USED |
| Request Type | Indicated by using different Interfaces of the Web Service |
| Result Code | Indicated with exceptions |
| Service Context Id | parameters:service |
| Service Identifier | parameters:operation |
| Service Key | parameters:serviceKey |
| Service Specific Units | volume; additionally parameters:unit MAY indicate the unit of measure used, parameters:service and parameters:operation SHALL carry the necessary information on the service context needed to interpret the service specific units |
| Subscription Id | endUserIdentifier |
| Subscription Data | endUserIdentifier |
| Subscription Type | endUserIdentifier |
| Time | volume; additionally parameters:unit SHALL indicate a time unit |
| Unit Value | charge:amount |
| User Equipment Info | NOT USED |
| User Equipment Info Type | parameters:userEquipmentInfoType |
| User Equipment Info Value | parameters:userEquipmentInfoValue |
| Value Digits | charge:amount |

Table 10: Mapping to Parlay X message parts

Appendix A. Change History

A.1 Approved Version History

| Reference | Date | Description |
|-----------|------|------------------|
| n/a | n/a | No prior version |

A.2 Draft/Candidate Version 1.1 History

| Document Identifier | Date | Sections | Description |
|---|--------------|--|--|
| Draft Version OMA-TS-Charging_Offline-V1_1 | 12 June 2007 | | Initial revision based on version 1.0 |
| | 27 Feb 2008 | 8.2 | Incorporated following CRs: OMA-MCC-2008-0019 OMA-MCC-2007-0144R01 OMA-MCC-2007-0143 |
| | 24 Jun 2008 | 3.2, 8.1.3, 8.2.3 | Incorporated following CRs: OMA-MCC-2008-0036 OMA-MCC-2008-0051 |
| | 19 Aug 2008 | 2.1, 5, 6.1, 6.2, 7.1, 7.2, 8, App B | Incorporated following CRs: OMA-MCC-2008-0071 OMA-MCC-2008-0072 |
| | 23 Oct 2008 | 6.1, 6.2, 8.1.2, 8.1.3, 8.2.3 | Incorporated following CRs: OMA-MCC-2008-0078R01 OMA-MCC-2008-0081R01 OMA-MCC-2008-0084R01 |
| | 16 Dec 2008 | 6.1, 7.2 | Icorporated following CRs: OMA-MCC-2008-0109 |
| Candidate Version OMA-TS-Charging_Offline-V1_1 | 13 Feb 2009 | n/a | Status changed by TP TP ref# OMA-TP-2009-0062- INP_Charging_V1_1_ERP_for_Candidate_Approval |
| Draft Version OMA-TS-Charging_Offline-V1_1 | 16 Jun 2009 | 2.1, 6.1 6.2, 8.1.2.2 8.1.3, 8.1.4 | Incorporated agreed changes: OMA-MCC-2009-0020R01- CR_Parameter_cleansing_in_Offline_Charging. |
| Candidate Version OMA-TS-Charging_Offline-V1_1 | 28 Jul 2009 | All | Status changed to Candidate by TP: OMA-TP-2009-0320- INP_Charging_V1_1_ERP_for_Candidate_re_Approval |

Appendix B. Static Conformance Requirements (Normative)

The notation used in this appendix is specified in [IOPPROC].

B.1 SCR for the Charging Enabler User

B.1.1 Generic SCR

| Item | Function | Reference | Status | Requirement |
|---------------|--|---|--------|-------------|
| Offline-C-001 | Implement the client-side state machine for at least one of the specified bindings | RFC 3588, TS29.199-6 | M | |
| Offline-C-002 | Support of Event Charging | Section 7.1 | M | |
| Offline-C-003 | Support of Session Charging | Section 7.2 | O | |
| Offline-C-004 | Error handling is dealt with as specified for the supported bindings | RFC 3588 (sect.7), TS29.199-6 (sect. 9) | M | |

B.1.2 SCR for Event-based Charging

| Item | Function | Reference | Status | Requirement |
|---------------------|---------------------------|---------------|--------|-------------|
| Offline-Event-C-001 | Support an Event Request. | Section 6.1.2 | M | |

B.1.3 SCR for Session-based Charging

| Item | Function | Reference | Status | Requirement |
|-----------------------|----------------------------|---------------|--------|-------------|
| Offline-Session-C-001 | Support a Start Request | Section 6.1.3 | M | |
| Offline-Session-C-002 | Support an Interim Request | Section 6.1.4 | O | |
| Offline-Session-C-003 | Support a Stop Request | Section 6.1.5 | M | |

B.2 SCR for the Charging Enabler

B.2.1 Generic SCR

| Item | Function | Reference | Status | Requirement |
|---------------|--|---|--------|---|
| Offline-S-001 | Implement the server-side state machine for at least one of the specified bindings | RFC 3588, TS29.199-6 | M | For the Diameter binding: Implement the accounting state machine "SERVER, STATELESS ACCOUNTING" |
| Offline-S-002 | Support of Event-based Charging | Section 7.1 | M | |
| Offline-S-003 | Support of Session-based Charging | Section 7.2 | M | Not applicable for the Parlay X binding |
| Offline-S-004 | Error handling is dealt with as specified for the supported bindings | RFC 3588 (sect.7), TS29.199-6 (sect. 9) | M | |

B.2.2 SCR for Event-based Charging

| Item | Function | Reference | Status | Requirement |
|---------------------|--|-------------|--------|-------------|
| Offline-Event-S-001 | Support a response to an Event Request | Section 6.2 | M | |

B.2.3 SCR for Session-based Charging

| Item | Function | Reference | Status | Requirement |
|-----------------------|--|-------------|--------|-------------|
| Offline-Session-S-001 | Support a response to a Start Request | Section 6.2 | M | |
| Offline-Session-S-002 | Support a response to an Interim Request | Section 6.2 | M | |
| Offline-Session-S-003 | Support a response to a Stop Request | Section 6.2 | M | |