



OMA Offline Charging Interface

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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, logical messages, and messages types of 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_0, URL: <http://www.openmobilealliance.org/>
- [CHRG_ONLINE] “OMA Online Charging Interface”, Open Mobile Alliance™. OMA-TS-Charging_Online-V1_0, URL: <http://www.openmobilealliance.org/>
- [IOPPROC] “OMA Interoperability Policy and Process”, Version 1.1, Open Mobile Alliance™, OMA-IOP-Process-V1_1, URL: <http://www.openmobilealliance.org/>
- [OMNA] “Open Mobile Numbering Authority”, Registries under category “OMA Charging”, URL: <http://www.openmobilealliance.org/tech/omna/index.htm>
- [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>
- [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.

Authorization	The act of determining whether something or someone will be granted access to a resource.
CH-1	Offline Charging Interface
CH-2	Online Charging Interface
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 Record	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.
Resource	Any component, enabler, function or application that can send, receive and process requests.

3.3 Abbreviations

3GPP	3 rd Generation Partnership Project
3GPP/2	3GPP and 3GPP2
3GPP2	3 rd Generation Partnership Project 2
ACA	Accounting Answer
ACR	Accounting Request
AVP	Attribute Value Pair
OMA	Open Mobile Alliance
RFC	Request for Comments
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.

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 in CH-1

The offline charging interface supports two charging models, an event triggered charging model and a session based charging model. In the event triggered model, the Charging Enabler User reports each service usage to the Charging Enabler with a single Charging Record. In the session based charging model, the Charging Enabler User sends several Charging Records 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-triggered model), or a step in a series of events that correspond to a session (session based model). This results in four different types of request messages: EventRecord for the event triggered model, and StartRecord, InterimRecord, and StopRecord for the session based model (figure 1). The type of the offline charging request is indicated by the value in OMA Charging Data Element “Record Type”.

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

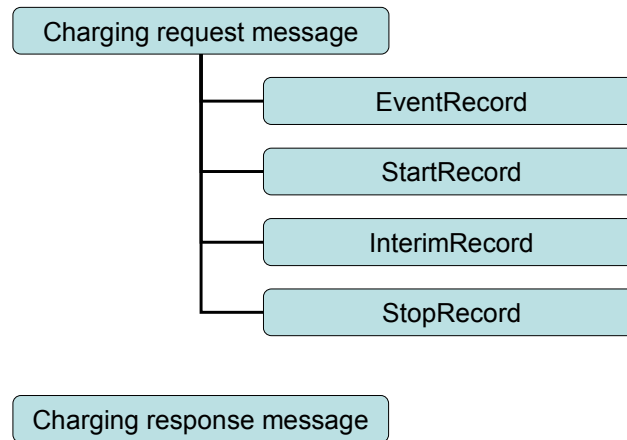


Figure 1: Messages

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 triggered charging model, and the other 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.x.

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

The "level" column allows the reader to clearly identify the hierarchy in between data elements. Let's take the example of a data element "A" (level n) followed by data elements "B" and "C" (both being level n+1). This means that element A is composed of element B and element C.

Level	OMA Charging Data Element	Category	Description
1	Session Id	Mandatory	This data element is used to identify a specific session. All messages pertaining to a specific session MUST use the same value.
1	Origin Host	Mandatory	This data element identifies the endpoint that originated the message.
1	Origin Realm	Mandatory	This data element contains the realm of the originator of any message.
1	Destination Realm	Mandatory	This data element contains the realm the message is to be routed to.
1	Request Type	Mandatory	This data element indicates the type of the Charging Request message.
1	Request Number	Mandatory	This data element identifies this request within one session.
1	Request Interim Interval	Optional	This data element indicates the time interval for which interim records are requested for the session.
1	Origin State Id	Optional	This data element contains a monotonically increasing value that is advanced whenever an entity restarts with loss of previous state.
1	Event Timestamp	Optional	This data element records the time at which the reported event occurred.
1	Service information	Optional	This data element contains all the Charging Enabler User specific information.
2	Service Generic Information	Optional	This data element contains information related to service usage that is common to different services/enablers.
3	Service Context Id	Mandatory	This data element contains a value to identify the service/enabler specification in the context of which the charging events must be 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.
3	Correlation Id	Optional	This data element contains information to correlate offline charging requests generated by different service components of the application.
3	Subscription Id	Optional	This data element identifies the end user's subscription
4	Subscription Id Type	Mandatory	This data element identifies which type of identifier is carried by the subscription-Id e.g.: email, MSISDN, IMSI, SIP URI...
4	Subscription Id Data	Mandatory	This data element identifies the end user.

Level	OMA Charging Data Element	Category	Description
3	Time	Optional	This data element indicates the length of the used time in seconds.
3	Money	Optional	This data element specifies the monetary amount in the given currency. The Currency Code data element should be included when this data element is included.
4	Unit Value	Mandatory	This data element describes a value for instance a monetary value. It consists of Value Digits and Exponent.
5	Value Digits	Mandatory	This data element contains the significant digits of a Unit Value without any decimal point.
5	Exponent	Optional	This data element contains the 10-x exponent that should be applied to the Value Digits.
4	Currency Code	Optional	This data element specifies which currency is used in a monetary value described by the Money data element.
3	Input Octets	Optional	This data element contains the number of used octets that can be/have been received from the end user.
3	Output Octets	Optional	This data element contains the number of used octets that can be/have been sent to the end user.
3	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
3	Service Identifier	Optional	This data element contains the identifier of a specific service within the given service context, e.g. operation type.
3	Service Key	Optional	This data element can be used to identify the particular service item delivered.
3	User Equipment Info	Optional	This data element indicates the identity and capability of the terminal the end-user is using.
4	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.
4	User Equipment Info Value	Mandatory	This data element contains the identity of the user equipment.

Table 1: Charging Request message

6.1.1 Event, and Session

As implied earlier in section 5, in the event triggered charging model, an EventRecord 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 EventRecord to report each service usage to the Charging Enabler with a single charging record, independent from any other charging record (see the flow in section 7.1.1).

In contrast, in the session based charging model, a session consists of several events that are related with each other: StartRecord, InterimRecord and StopRecord 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 StartRecord, one StopRecord, and zero or more InterimRecords in-between.

6.1.2 EventRecord

The EventRecord is used in the event triggered charging model to describe a single, distinct event.

The message structure for the EventRecord 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: EventRecord

6.1.3 StartRecord

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

The message structure for the StartRecord 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: StartRecord

6.1.4 InterimRecord

The InterimRecord 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 records for the same ongoing session.

The message structure for the InterimRecord 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: InterimRecord

6.1.5 StopRecord

The StopRecord 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 StopRecord 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 Interim)

Table 5: StopRecord

6.2 Charging Response Message

The charging response message is the response 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”.

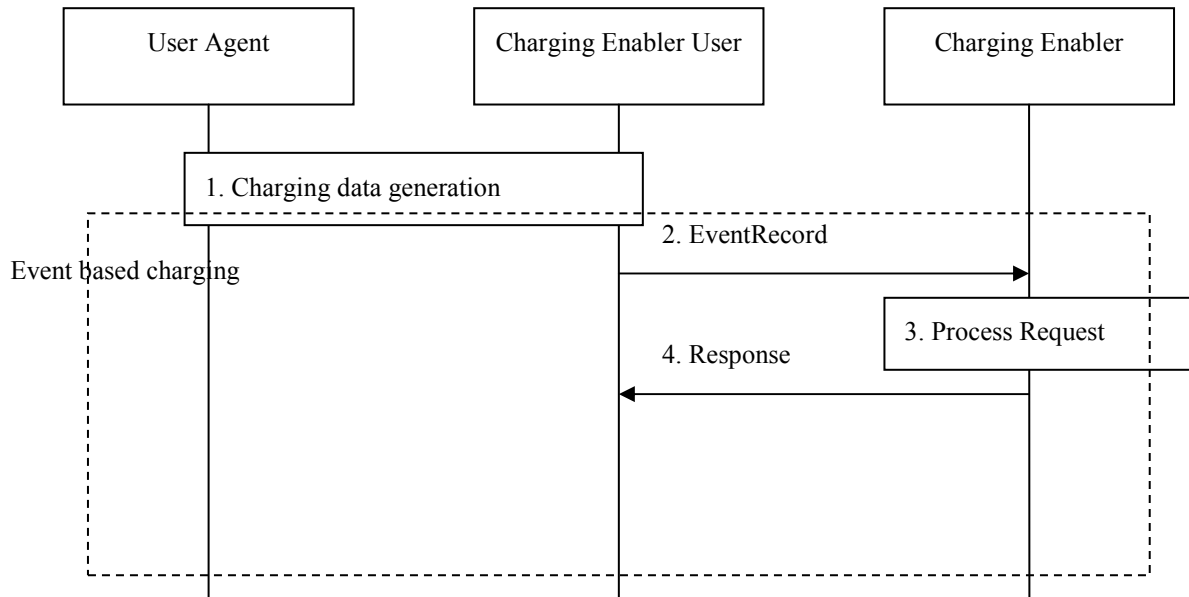
The following table defines the data elements for a Charging response message.

OMA Charging Data Element	Category	Description
Session Id	Mandatory	This data element is used to identify a specific session. All messages pertaining to a specific session must the same value.
Result Code	Mandatory	This data element indicates the result of a particular request.
Origin Host	Mandatory	This data element identifies the endpoint that originated the message.
Origin Realm	Mandatory	This data element identifies the realm of the originator of any message.
Request Type	Mandatory	This data element indicates the type of the corresponding Charging request message.
Request Number	Mandatory	This data element identifies this request within one session.
Request Interim Interval	Optional	This data element indicates the time interval for which interim records are requested for the session.
Origin State Id	Optional	This data element contains a monotonically increasing value that is advanced whenever an entity restarts with loss of previous state.
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 Triggered Charging Model

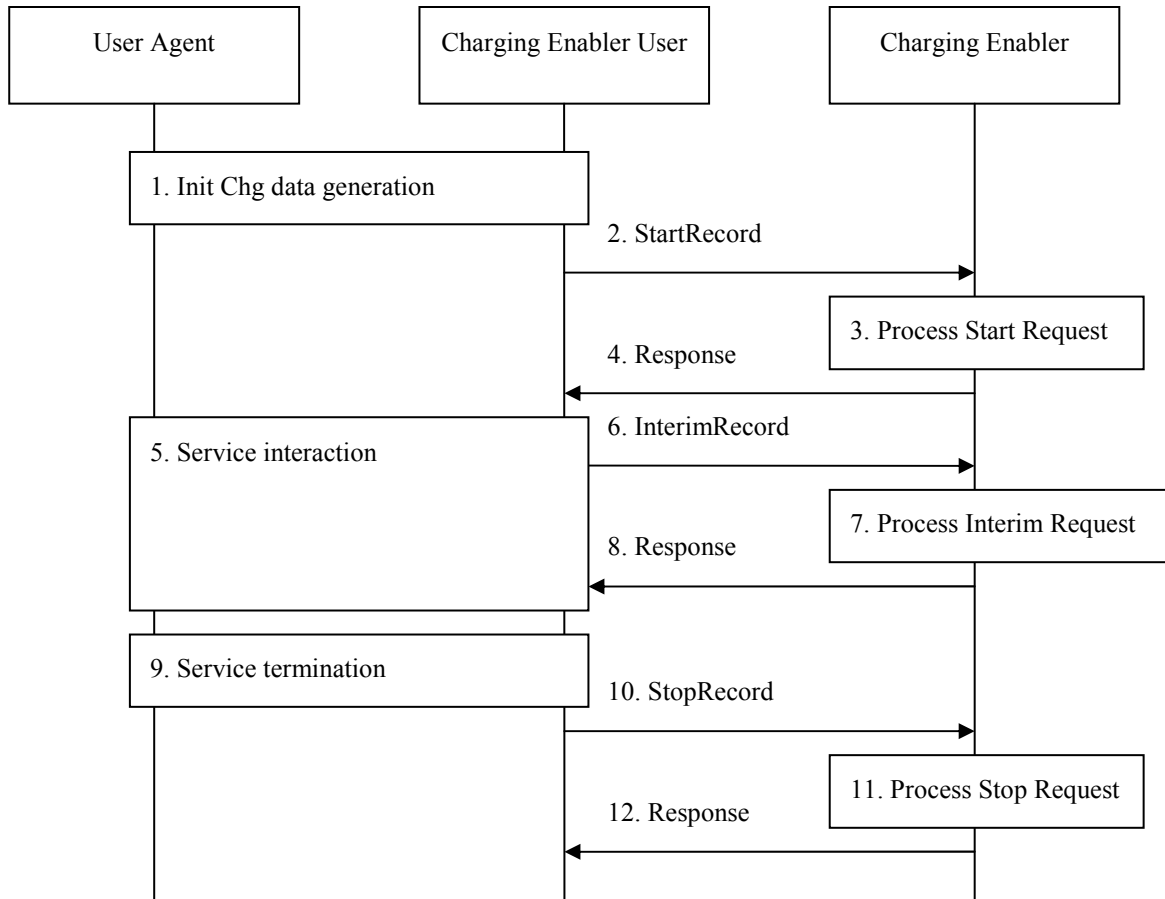


Flow 1: Offline charging request event-record generation

The above flow depicts the event triggered charging model and the generation of the EventRecord 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. “**EventRecord**”: As a result of the service usage, the Charging Enabler User invokes the CH-1 interface and calls the Charging Enabler.
3. “**Process 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: Offline charging session based charging

This is a possible flow for offline, session based charging. In addition to the offline event based charging in section (7.1.1), 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. “**StartRecord**”: The Charging Enabler User invokes CH-1, and sends in the initial StartRecord a request indicating to start a logical session that is associated with the service interaction. The StartRecord 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. “**InterimRecord**”: 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 (Request Interim Interval) 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. **“StopRecord”**: The Charging Enabler User sends final charging information to the Charging Enabler. This message implies that the session opened by the initial StartRecord 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 section aims to describe the mapping between the general (protocol independent) messages and OMA Charging Data Elements described in section 6 with the actual protocol(s) utilized on the CH-1 charging 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.

With regard to the Diameter protocol the Charging Enabler User acts as the Diameter Client in the sense that it is the entity generating charging data and sending the charging records to the Diameter Server. The client implements the account state machine described in [RFC3588]. The Charging Enabler acts as the Diameter Server in the sense that it is the entity storing the charging records. The server implements 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, e.g. [~~Acct-Multi-Session-Id~~]. If such parameters are present, they will not constitute an error. The bracket conventions and the asterisk (*) below are used as 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 and Session based requests. The Accounting Answer (ACA) commands are used to communicate Event and Session based responses.

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

- Re-Auth-Request (RAR) and Re-Auth-Answer (RAA);
- Capability-Exchange-Request (CER) and Capability-Exchange-Answer (CEA);
- Device-Watchdog-Request (DWR) and Device-Watchdog-Answer (DWA);
- Abort-Session-Request (ASR) and Abort-Session-Answer (ASA);
- 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-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 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 [OMNA].

OMA Charging Data Element	Diameter Accounting AVP
Request Number	Accounting-Record-Number
Request Type	Accounting-Record-Type
Request Interim Interval	Acct-Interim-Interval
Input Octets	Accounting-Input-Octets
Money	CC-Money

OMA Charging Data Element	Diameter Accounting AVP
Output Octets	Accounting-Output-Octets
Service Specific Units	CC-Service-Specific-Units
Time	Acct-Session-Time
Correlation Id	[OMNA]
Currency Code	Currency-Code
Destination Realm	Destination-Realm
Event Timestamp	Event-Timestamp
Exponent	Exponent
Origin Host	Origin-Host
Origin Realm	Origin-Realm
Origin State Id	Origin-State-Id
Result code	Result-Code
Service Context Id	Service-Context-Id
Service Identifier	Service-Identifier
Service Information	Service-Information
Session Id	Session-Id
Subscription Id	Subscription-Id
Subscription Id Data	Subscription-Id-Data
Subscription Id Type	Subscription-Id-Type
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
Service Key	[OMNA]
Service Generic Information	[OMNA]

Table 7: Bindings for Accounting

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 SGI: Indicates if it is mandatory, optional or not used in the Service Generic 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	SGI			Must	May	Should Not	Must Not	
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
CC-Money	413	-	-	O	[RFC4006]	Grouped	M	P	-	V	Y
CC-Service-Specific-Units	417	-	-	O	[RFC4006]	Unsigned64	M	P	-	V	Y
Currency-Code	425	-	-	O	[RFC4006]	Unsigned32	M	P	-	V	Y
Destination-Realm	283	M	-	-	[RFC3588]	DiamIdent	M	P	-	V	N
Event-Timestamp	55	O	O	-	[RFC3588]	Time	M	P	-	V	N
Exponent	429	-	-	O	[RFC4006]	Integer32	M	P	-	V	Y
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
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
Session-Id	263	M	M	-	[RFC3588]	UTF8String	M	P	-	V	Y
Service-Context-Id	461	-	-	M	[RFC4006]	UTF8String	M	P	-	V	Y
Service-Identifier	439	-	-	O	[RFC4006]	UTF8String	M	P	-	V	Y
Service-Information	873	O	-	-	[TS32.299]	Grouped	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
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 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].

Appendix A. Change History

A.1 Approved Version History

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

A.2 Draft/Candidate Version 1.0 History

Document Identifier	Date	Sections	Description
Draft Version OMA-TS-Offline_Charging_Interface-V1_0	23 Aug 2005		Document template creation
Draft Versions OMA-TS-Offline-Charging-Interface-V1_0	06 Oct 2005	5, 6, 7, 8 9	Incorporates input from: OMA-MCC-2005-0215R01
	05 Jan. 2006		Incorporates the following agreed input contributions that were submitted to the OMA MCC Athens meeting: OMA-MCC-2005-0275R02 OMA-MCC-2005-0290 OMA-MCC-2005-0274R01
	07 Feb 2006		Incorporates the following agreed input contributions: OMA-MCC-2006-0005 OMA-MCC-2006-0006R02 OMA-MCC-2006-0019R02 OMA-MCC-2006-0028R01 OMA-MCC-2006-0029 OMA-MCC-2006-0032R01 Changed formatting to align with Times New Roman 10pt. Removed obvious “comments”/Editors notes (that have been dealt with by the available input).
Draft Versions OMA-TS-Offline_Charging_Interface-V1_0	23 Mar 2006		Incorporates the following agreed input contributions: OMA-MCC-2006-0057 OMA-MCC-2006-0061 OMA-MCC-2006-0064R02 OMA-MCC-2006-0066 Editorial clean-up of document and diagram styles.
	04 Apr 2006	2.1, 2.2, 6.2, 8.1., 8.2, 8.3 8.2.3 6.1 8.2.3, 8.3	Incorporates the following agreed input contributions: OMA-MCC-2006-0085R01 OMA-MCC-2006-0087R01 OMA-MCC-2006-0093R01 OMA-MCC-2006-0093R02 OMA-MCC-2006-0087R02
	05 Apr 2006	6.1, 8.2.1 6.2, 8.2.2 6.1 1, 6.1, 8 3.2, 7, 8.3 (now 8.1.6)	Incorporates the following agreed input contributions: OMA-MCC-2006-0095R02 OMA-MCC-2006-0096R02 OMA-MCC-2006-0098R01 OMA-MCC-2006-0099R01 OMA-MCC-2006-0101R01
	11 May 2006	Whole document	Incorporates the following agreed input contributions: OMA-MCC-2006-0124R01

Document Identifier	Date	Sections	Description
Draft Version OMA-TS-Charging_Offline-V1_0	25 Aug 2006	All	Updated in line with consistency review comment CH1-005 (see OMA-CONRR-Charging-V1_0-20060608-D). Document name changed to OMA-TS-Charging_Offline-V1_0 (review comment TS-001). Incorporation of the following CRs to resolve review comments: OMA-MCC-2006-0136R02 OMA-MCC-2006-0137R01 OMA-MCC-2006-0153R02 OMA-MCC-2006-0154 OMA-MCC-2006-187R01 Incorporation of two Class 2 CR: OMA-MCC-2006-0176R01 OMA-MCC-2006-0193
Candidate Version OMA-TS-Charging_Offline-V1_0	26 Sep 2006	n/a	Status changed to Candidate by TP: TP ref. # OMA-TP-2006-0305- INP_Charging_V1_0_ERP_for_Candidate_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 account state machine.	RFC 3588	M	
Offline-C-002	Support of Event Charging	Section 6.1.1	M	
Offline-C-003	Support of Session Charging	Section 6.1.1	M	
Offline-C-004	Error handling is dealt with as specified in the Diameter Base Protocol	RFC 3588 (sect.7)	M	

B.1.2 SCR for Event 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 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 accounting state machine "SERVER, STATELESS ACCOUNTING"	RFC 3588	M	
Offline-S-002	Support of Event Charging	Section 6.2	M	
Offline-S-003	Support of Session Charging	Section 6.2	M	
Offline-S-004	Error handling is dealt with as specified in the Diameter Base Protocol	RFC 3588 (sect.7)	M	

B.2.2 SCR for Event 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 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	