



OMA DCD Charging

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1. Scope

This document specifies the use of OMA Charging Enabler to realise the offline and online charging requirements of OMA DCD Enabler. The OMA Charging Enabler defines a set of interfaces that are utilised by the other Enablers to fulfil their charging requirements. The interfaces are specified in [OMA-AD-Charging-V1_0]. This document defines how, when and by which entities charging is triggered and which function invokes charging over the OMA Charging Enabler interfaces. This document also defines the data that will be exchanged during the process.

This document specifies in detail:

- The charging models for the OMA DCD enabler,
- The logical messages and message types used on CH-1 and CH-2 interfaces,
- The flow of messages between the Charging Enabler User and the Charging Enabler with regard to the DCD Service and applicable DCD scenarios,
- Mapping of the DCD parameters to the OMA Charging Data Elements

2. References

2.1 Normative References

- [DCD-AD] “Dynamic Content Delivery Architecture”, Open Mobile Alliance™, OMA-AD-DCD -V1_0, URL: <http://www.openmobilealliance.org/>
- [DCD-Semantics] “Dynamic Content Delivery Technical Specification – Session and Transactions ”, Open Mobile Alliance™, OMA-TS-DCD_Semantics -V1_0, URL: <http://www.openmobilealliance.org/>
- [OMA-AD-Charging-V1_0] “Charging Architecture”, Open Mobile Alliance™. OMA-AD-Charging-V1_0, URL: <http://www.openmobilealliance.org/>
- [OMA-Charging-Offline] “OMA Offline Charging Interface”, Open Mobile Alliance™. OMA-TS-Charging_Offline-V1_0, URL: <http://www.openmobilealliance.org/>
- [OMA-Charging-Online] “OMA Online Charging Interface”, Open Mobile Alliance™. OMA-TS-Charging_Online-V1_0, 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>
- [RFC4234] “Augmented BNF for Syntax Specifications: ABNF”. D. Crocker, Ed., P. Overell. October 2005, URL:<http://www.ietf.org/rfc/rfc4234.txt>
- [SCRRULES] “SCR Rules and Procedures”, Open Mobile Alliance™, OMA-ORG-SCR_Rules_and_Procedures, URL:<http://www.openmobilealliance.org/>

2.2 Informative References

- [OMADICT] “Dictionary for OMA Specifications”, Version x.y, Open Mobile Alliance™, OMA-ORG-Dictionary-Vx_y, 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

CH-1 EventRequest	Refers to the EventRequest defined in [OMA-Charging-Offline]
CH-1 StartRequest	Refers to the StartRequest defined in [OMA-Charging-Offline]
CH-1 InterimRequest	Refers to the InterimRequest defined in [OMA-Charging-Offline]
CH-1 StopRequest	Refers to the StopRequest defined in [OMA-Charging-Offline]
CH-1 Response	Refers to the Charging Response Message defined in [OMA-Charging-Offline]
CH-2 Initial Request	Refers to the Initial Request defined in [OMA-Charging-Online]
CH-2 Update Request	Refers to the Update Request defined in [OMA-Charging-Online]
CH-2 Termination Request	Refers to the Termination Request defined in [OMA-Charging-Online]
CH-2 Response	Refers to the Charging Response Message defined in [OMA-Charging-Online]
CH-2 Balance Check Request	Refers to the Balance Check Request defined in [OMA-Charging-Online]
CH-2 Direct Debit Request	Refers to the Direct Debit Request defined in [OMA-Charging-Online]

3.3 Abbreviations

AD	Architecture Document
DCD	Dynamic Content Delivery
DECA	DCD-Enabled Client Application
IMSI	International Mobile Subscriber Identity
ISDN	Integrated Services Digital Network
ISO	International Organisation for Standardisation
MSISDN	Mobile Subscriber ISDN Number
OMA	Open Mobile Alliance
RFC	Request For Comments
SCR	Static Compliance Requirement
SIP	Session Initiation Protocol
TS	Technical Specification
URI	Uniform Resource Identifier

4. Introduction

The OMA Charging Enabler provides offline and online charging specifications for OMA enablers. This document is part of the Dynamic Content Delivery (DCD) Enabler and specifies charging for the periodic delivery of personalised or customized content for the DCD Enabler.

4.1 Version 1.0

Support for DCD 1.0

5. DCD Charging Architecture

The OMA DCD service architecture is described in [DCD-AD]. Figure 1 depicts the high-level OMA DCD charging architecture.

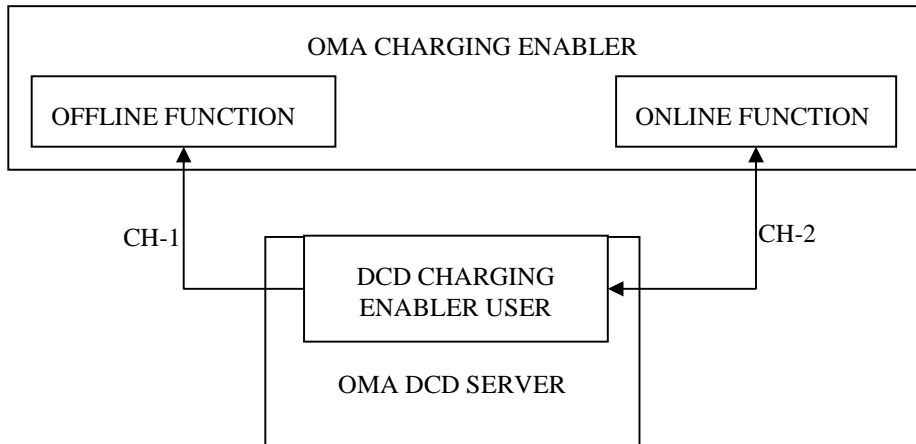


Figure 1: Charging architecture for DCD charging

In this figure:

- CH-1 is Offline charging reference point between DCD Server and the Offline Function of the Charging Enabler.
- CH-2 is Online charging reference point between DCD Server and the Online Function of the Charging Enabler.

The OMA DCD Server MAY comprise the DCD Charging Enabler User, a function that monitors and generates the charging events, sends the charging requests to the Charging Enabler and receives the responses from the Charging Enabler, over CH-1, CH-2 or both interfaces. The interface between other OMA DCD Server functions and the DCD Charging Enabler User is outside the scope of this TS.

The OMA DCD Server SHALL generate charging requests for all subscribed users to channels for which charging is not handled by the Content Provider.

6. DCD Charging Principles and Scenarios

The scope of this specification covers charging for service usage related to the OMA Dynamic Content Delivery Enabler, i.e. events related to channel subscriptions and content consumption. Charging for the use of distribution mechanisms or other underlying facilities is outside of the scope of this specification.

This document specifies support for two different charging mechanisms: offline charging (Section 6.2) and online charging (Section 6.3). Support for online charging is mandatory and support for offline charging is optional. For more details related to conformance requirements, please see Appendix B.

The specifications of the OMA Charging Enabler as well as this specification cover the usage of the OMA charging interfaces, and the behaviour of the Charging Enabler to the extent that it directly relates to the charging mechanisms and logical functions specified in [OMA-AD-Charging-V1_0], e.g. quota management and account balance management. Although the charging interfaces can also be used to exchange information related to other purposes (e.g. usage tracking and reporting), and Data Element usage for such purposes may be specified in this document, it is important to note that any underlying functionality related to processing such information is deployment specific and outside the scope of the OMA Charging Enabler.

This chapter covers the principles on which the generation and processing of DCD-related charging events are based, and the charging scenarios (event flows) that are to be supported. All definitions of chargeable events and charging scenarios in this chapter are based on the principles that each entity generating charging information produces charging events only for parties which this particular entity is serving.

6.1 DCD Charging Principles

The served parties may be any of the roles in the service delivery, depending on the scenario. These roles are:

- Client, content receiver.
- Content provider

OMA DCD charging may be based on:

- Subscription
- Content consumption
- Or a combination of the above.

This specification specifies the charging only for DCD service level, the charging for bearer level is out of the scope of the present document.

Online and offline specific charging details are given in the subsequent chapters.

6.1.1 Event Based Charging

The OMA Charging Enabler User SHALL use Event-based charging to enable charging for the following DCD procedures.

Chargeable Event	Specified in	Recordable event occurs at
<i>Subscription-Based Charging</i>		
Subscribe to a channel, internal subscription The DCD-Enabled Client Application sends a channel subscription request to the DCD Server.	[DCD-AD] 5.6.3 [DCD-Semantics] 7.1.3.7	DCD Server
Subscribe to a channel, external subscription The DCD Server receives a channel subscription notification from the DCD Content Provider.	[DCD-AD] 5.6.4 [DCD-Semantics] 7.2.1.3	DCD Server
Subscription update, notification from the DCD Content Provider The DCD Content Provider sends a subscription update notification to the DCD Server	[DCD-Semantics] 7.2.1.4	DCD Server
Unsubscribe from a channel The DCD Service Provider or DCD Enabled Client Application unsubscribes the user from some of the DCD Channels.	[DCD-AD] 5.6.7 [DCD-Semantics] 7.1.3.8, 7.2.1.2	DCD Server
<i>Content Consumption Charging</i>		
Content Delivery The DCD server delivers a content to DCD client	[DCD-AD] 5.6.5 [DCD-Semantics] 7.1.1.1, 7.1.2.1, 7.1.2.2	DCD Server
Pull method content delivery without confirmation The DCD Client requests for content update from the DCD Server. The DCD Client does not provide a delivery confirmation.	[DCD-AD] 5.6.5.1 [DCD-Semantics] 7.1.1.1	DCD Server
Pull method content delivery with confirmation The DCD Client requests for content update from the DCD Server. The DCD Client provides a delivery confirmation.	[DCD-AD] 5.6.5.1 [DCD-Semantics] 7.1.1.1	DCD Server
Push method content delivery without confirmation The DCD Server sends a content update to the DCD Client. The DCD Client does not provide a delivery confirmation.	[DCD-AD] 5.6.5.2 [DCD-Semantics] 7.1.2.1	DCD Server
Push method content delivery with confirmation The DCD Server sends a content update to the DCD Client. The DCD Client provides a delivery confirmation.	[DCD-AD] 5.6.5.2 [DCD-Semantics] 7.1.2.1	DCD Server
Content Submission The DCD Client sends content to the DCD Server for a particular channel	[DCD-Semantics] 7.1.1.2	DCD Server
Error Handling	[DCD-Semantics] 13	DCD Server
Usage Tracking The DCD Client tracks and report to the DCD Server the content consumption	[DCD-Semantics] 7.1.3.6	DCD-Server

Table 1: Event Based Charging

6.1.2 Session Based Charging

Not applicable.

6.2 DCD Offline Charging Scenarios

6.2.1 Basic principles

The charging models as given in chapter 6.1 SHALL be supported for offline charging.

These charging requests SHALL contain distinct service usage data for any of the described sub-services.

The charging request messages sent from an *DCD Server* are described in the following table. The table summarises the methods or events which may trigger the charging messages.

OMA Charging Message	Trigger
StartRequest	Not applicable
InterimRequest	Not applicable
StopRequest	Not applicable
EventRequest	A positive ChannelSubscriptionResponse() is sent
	A ContentUpdateResponse() is sent and the distribution mechanism does not support delivery confirmations
	A ContentUpdatePush() is sent and the distribution mechanism does not support delivery confirmations
	A ContentDeliveryConfirmation() is received (when delivery confirmations are supported)
	A ContentUpdateResponse() is received from a Content Provider
	An ErrorNotification() related to content delivery is received from a DCD Client

Table 2: Charging Request Message Triggered by Methods or Messages

6.2.2 Offline Event Charging for DCD

6.2.2.1 DCD Internal Subscription

Figure 2 shows the interaction between the DCD Server and the Charging Enabler within a DCD internal subscription flow where the subscription validation and the charging are handled by the DCD Server. The cases where the subscription and the charging are supported by the Content Provider are out of scope of this specification

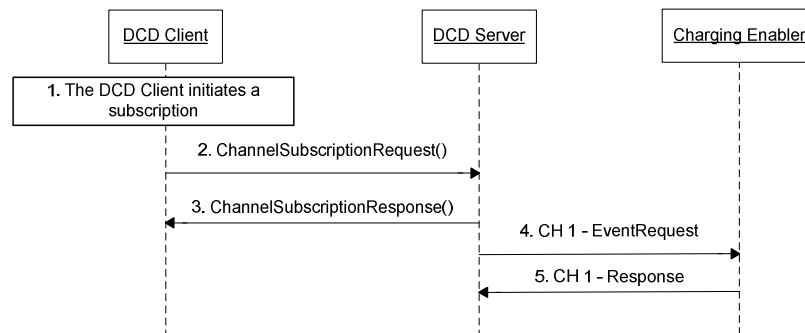


Figure 2: Offline Charging of DCD Internal Subscription

1. The DCD Client initiates a subscription, e.g. after having received a subscription request from the Enabled Client Application sends a subscription request to the DCD Client
2. The DCD Client sends a ChannelSubscriptionRequest() message to the DCD Server
3. The DCD Server sends a ChannelSubscriptionResponse to the DCD Client with the subscription status
4. **If the subscription is accepted by the DCD Server, the DCD Server SHALL send a CH-1 EventRequest to the Charging Enabler**

5. The Charging Enabler acknowledges with a CH-1 Response message

6.2.2.2 DCD External Subscription to a Registered Channel

In the *external subscription*, the channel subscription is triggered externally to DCD Enabler (e.g. web browser).

Figure 3 shows the interaction between the DCD Server and the Charging Enabler within a DCD external subscription flow where the charging is handled by the DCD Server. The case where the charging is supported by the Content Provider is out of scope of this specification

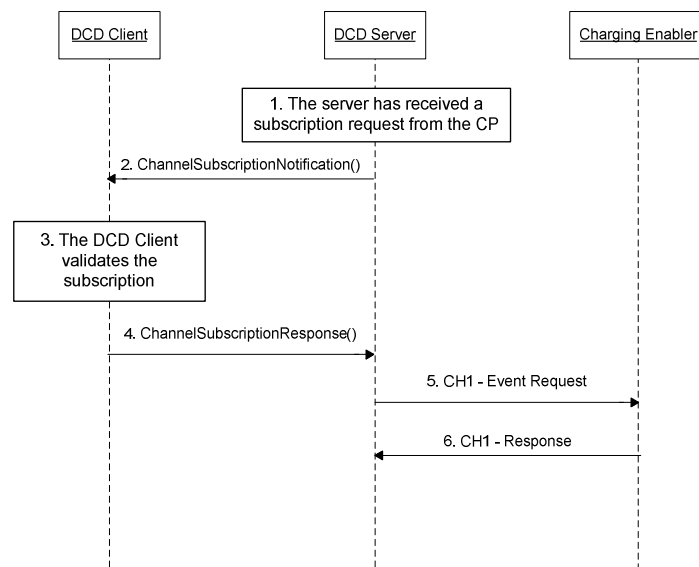


Figure 3: Offline Charging of DCD External Subscription to a Registered Channel

1. The DCD Server has received a subscription request from the Content Provider to inform him that a customer has requested a subscription
2. The DCD Server sends a ChannelSubscriptionNotification message to verify that the customer has requested for this subscription
3. The DCD Client validates the subscription
4. The DCD Client validates the subscription to the DCD Server containing the status of the validation
5. **If the subscription has been validated, the DCD Server SHALL send a CH-1 EventRequest to the Charging Enabler**
6. **The Charging Enabler acknowledges with a CH-1 Response message**

6.2.2.3 DCD Subscription to an Unregistered Channel

In this case, the DCD Enabled Client Application requests subscription to a channel not yet registered with the DCD Service Provider (i.e. the channel doesn't have channel-ID assigned).

Figure 4 shows the interaction between the DCD Server and the Charging Enabler within a DCD subscription flow to an unregistered channel, where charging is handled by the DCD Server. The case where the charging is supported by the Content Provider is out of scope of this specification.

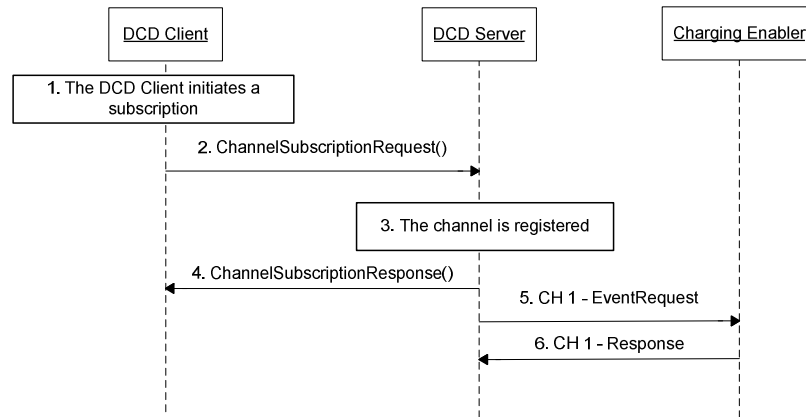


Figure 4: Offline Charging of DCD Subscription to an Unregistered Channel

1. The DCD Client initiates a subscription containing the channel reference, e.g. after having received a subscription request from the DCD Enabled Client Application
2. The DCD Client sends a ChannelSubscriptionRequest() message to the DCD Server
3. The new channel registered (DCD Server or Content Provider initiated)
4. The DCD Server sends a ChannelSubscriptionResponse to the DCD Client
5. **If the subscription is accepted by the DCD Server, the DCD Server SHALL send a CH-1 EventRequest to the Charging Enabler**
6. **The Charging Enabler acknowledges with a CH-1 Response message**

6.2.2.4 DCD Unsubscription requested by the DCD Client

Figure 5 shows the interaction between the DCD Server and the Charging Enabler within a DCD unsubscription flow where the subscription management and the charging are handled by the DCD Server. The cases where the subscription and the charging are supported by the Content Provider are out of scope of this specification

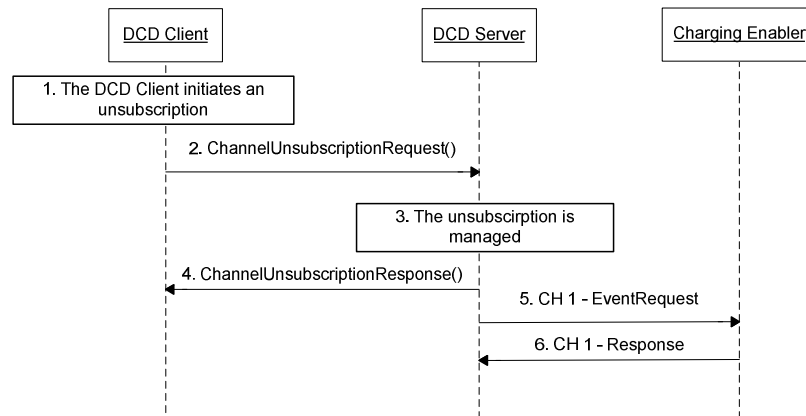


Figure 5: Offline Charging of DCD Unsubscription initiated by the DCD Client

1. The DCD Client initiates an unsubscription, e.g. after having received an unsubscription request from the DCD Enabled Client Application
2. The DCD Client sends a ChannelUnsubscriptionRequest() message to the DCD Server
3. The DCD Server processes the unsubscription request
4. The DCD Server sends a ChannelSubscriptionResponse to the DCD Client
5. **If the unsubscription is accepted by the DCD Server, the DCD Server SHALL send a CH-1 EventRequest to the Charging Enabler**
6. **The Charging Enabler acknowledges with a CH-1 Response message**

6.2.2.5 DCD Unsubscription requested by the Content Provider with confirmation

Figure 6 shows the interaction between the DCD Server and the Charging Enabler within a DCD unsubscription flow where the subscription management and the charging are handled by the DCD Server. The cases where the subscription and the charging are supported by the Content Provider are out of scope of this specification

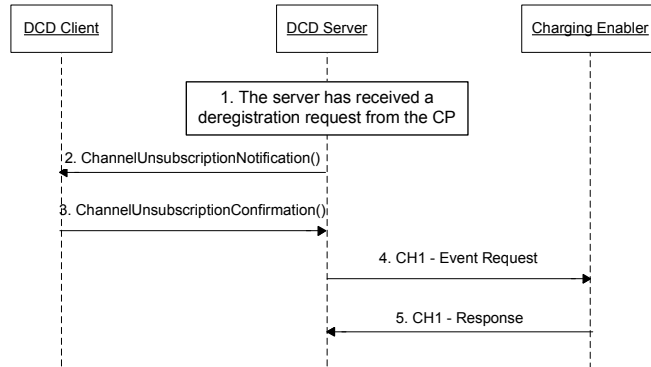


Figure 6: Offline Charging of DCD Unsubscription initiated by the CP with confirmation

1. The DCD Server has received a deregistration request from the Content Provider for a subscribed channel
2. The DCD Server sends a ChannelUnsubscriptionNotification() message to the DCD Client
3. The DCD Client acknowledges with a ChannelUnsubscriptionConfirmation() message
4. **If the unsubscription is confirmed, the DCD Server SHALL send a CH-1 EventRequest to the Charging Enabler**
5. The Charging Enabler acknowledges with a CH-1 Response message

6.2.2.6 DCD Unsubscription requested by the Content Provider without confirmation

Figure 7 shows the interaction between the DCD Server and the Charging Enabler within a DCD unsubscription flow where the subscription management and the charging are handled by the DCD Server. The cases where the subscription and the charging are supported by the Content Provider are out of scope of this specification

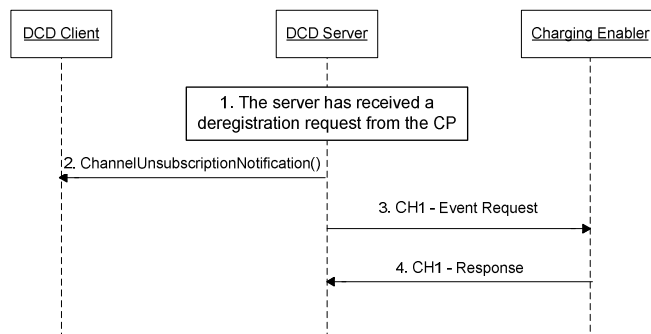


Figure 7: Offline Charging of DCD Unsubscription initiated by the CP without confirmation

1. The DCD Server has received a deregistration request from the Content Provider for a subscribed channel
2. The DCD Server sends a ChannelUnsubscriptionNotification() message to the DCD Client
3. **The DCD Server SHALL send a CH-1 EventRequest to the Charging Enabler**
4. **The Charging Enabler acknowledges with a CH-1 Response message**

6.2.2.7 Pull Content Delivery Method

DCD Pull Content Delivery can be initiated by the DCD Enable Client Application (e.g. upon user request) or by the DCD Client (e.g. based on delivery scheduled). In all cases the DCD Client requests content update to the DCD Server that can forward the request to the Content Provider or may already have received updated content.

6.2.2.7.1 Pull Content Delivery Method without Confirmation

Error! Reference source not found. Figure 8 shows the interaction between the DCD Server and the Charging Enabler for the Pull Content Delivery use case

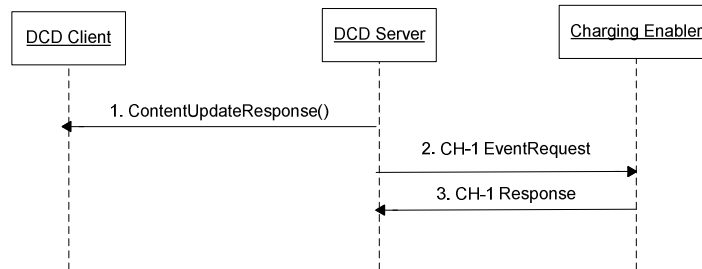


Figure 8: Offline Charging for Pull Content Delivery without Confirmation

1. The DCD Server sends a ContentUpdateResponse() message to the DCD Client that may have been triggered by a ContentUpdateRequest() message received from the DCD Client or the Content Provider
2. **Immediately after having sent the ContentUpdateResponse() message, the DCD Server SHALL send a CH-1 EventRequest to the Charging Enabler**
3. **The Charging Enabler acknowledges with a CH-1 Response message**

6.2.2.7.2 Pull Content Delivery Method with Confirmation

Error! Reference source not found. Figure 9 shows the interaction between the DCD Server and the Charging Enabler for the Pull Content Delivery use case

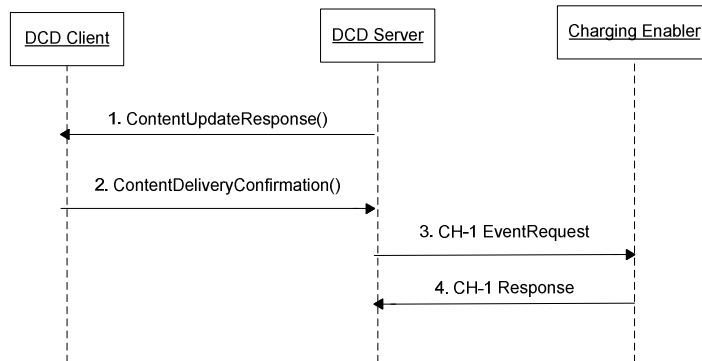


Figure 9: Offline Charging for Pull Content Delivery with Confirmation

1. The DCD Server sends a ContentUpdateResponse() message to the DCD Client that may have been triggered by a ContentUpdateRequest() message received from the DCD Client or the Content Provider
2. The DCD Client sends a ContentDeliveryConfirmation() message to the DCD Server to inform it of the content delivery status
3. **If the delivery was successful, the DCD Server SHALL send a CH-1 EventRequest to the Charging Enabler**
4. **The Charging Enabler acknowledges with a CH-1 Response message**

6.2.2.8 Push Content Delivery method

When the user has subscribed to a channel that supports the Push Method, and a new content becomes available, the DCD Server automatically sends the content or a link to it (i.e. without requiring the Client to request it)

6.2.2.8.1 Content Push without delivery confirmation

Figure 10 shows the interaction between the DCD Server and the Charging Enabler when the DCD Server pushes an updated content

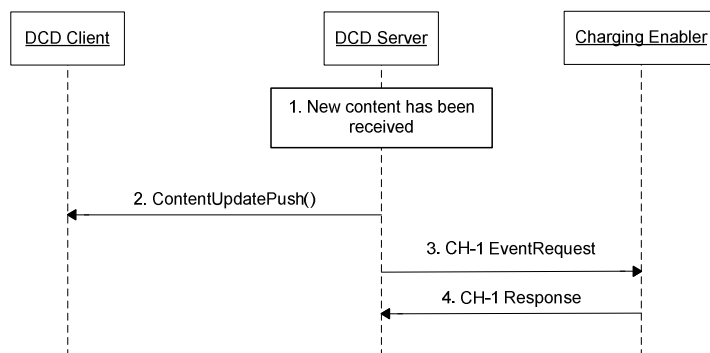


Figure 10: Offline Charging for Content Push without Delivery Confirmation

1. The DCD Server has received a new content (e.g. a DCD Content Provider sent a ContentUpdate() message)

2. The DCD Server sends the content to the DCD Client
3. **The DCD Server SHALL send a CH-1 EventRequest to the Charging Enabler**
4. **The Charging Enabler acknowledges with a CH-1 Response message**

6.2.2.8.2 Content Push with delivery confirmation

Figure 11 shows the interaction between the DCD Server and the Charging Enabler when the DCD Server pushes an updated content

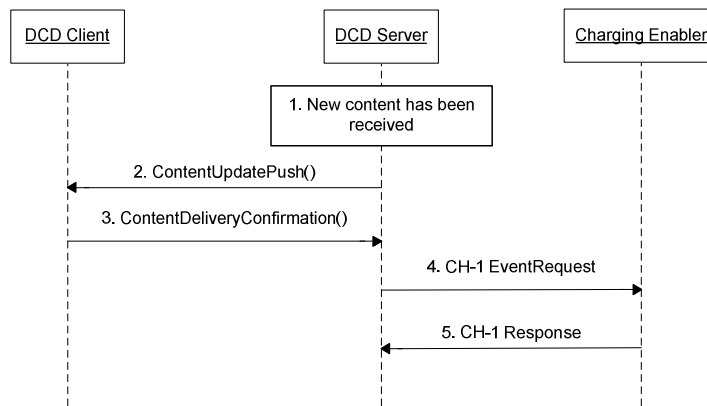


Figure 11: Offline Charging for Content Push with Delivery Confirmation

1. The DCD Server has received a new content (e.g. a DCD Content Provider sent a ContentUpdate() message)
2. The DCD Server sends the content to the DCD Client
3. The DCD Client sends a ContentDeliveryConfirmation() message to the DCD Server
4. **If the delivery was successful, the DCD Server SHALL send a CH-1 EventRequest to the Charging Enabler**
5. **The Charging Enabler acknowledges with a CH-1 Response message**

6.2.2.9 Content Submission

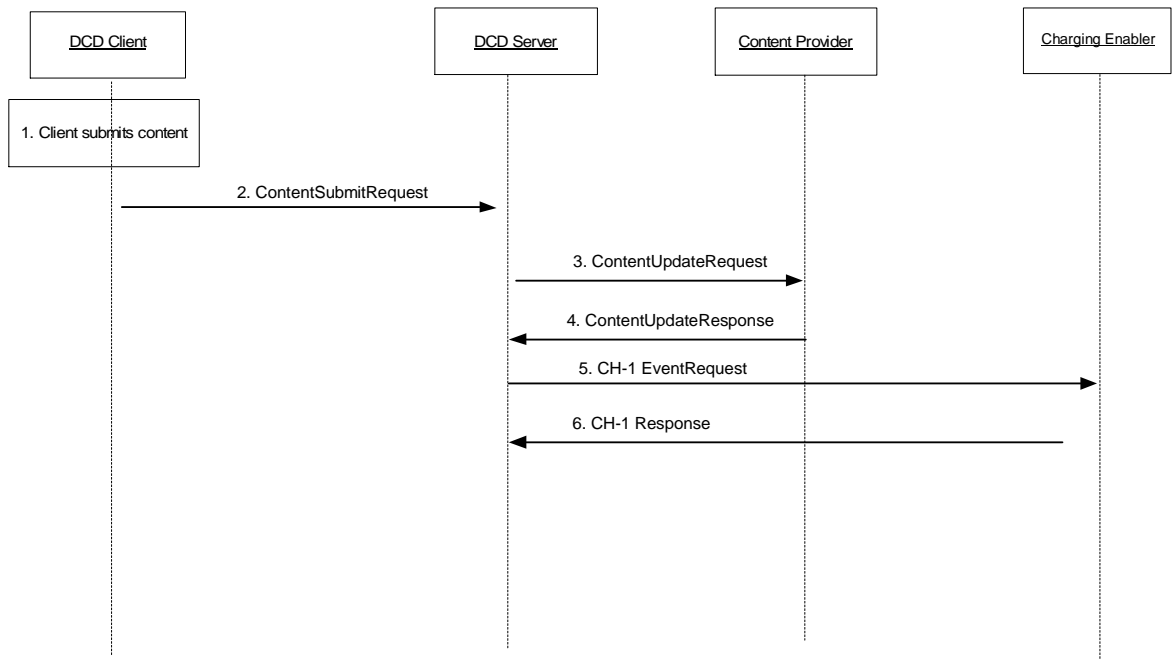


Figure 12: Offline Charging for Content Submission

1. The DCD Client submits content (eg the DECA has sent a ContentSubmitRequest())
2. The DCD Client forwards this request to the DCD Server
3. The DCD server sends ContentUpdateRequest which include parameters from ContentSubmitRequest message to the Content Provider
4. The DCD server receives ContentUpdateResponse from Content Provider
5. DCD Server send SHALL send a CH-1 EventRequest to the Charging Enabler
6. The Charging Enabler acknowledges with a CH-1 Response Message

6.2.2.10 Usage Tracking Report

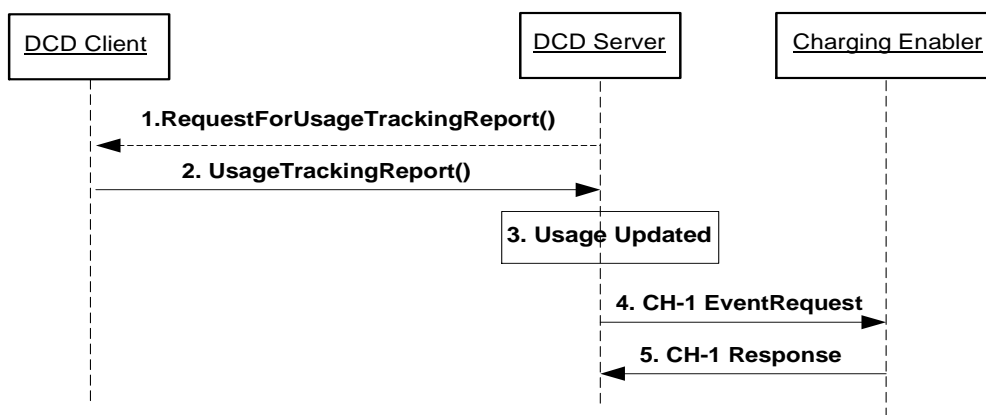


Figure 13: Offline Charging for Usage Tracking Report

1. The DCD Client has received a RequestForUsageTrackingReport() message from the DCD Server (Optional condition)
2. The DCD Client sends a UsageTrackingReport() message (scheduled or upon an event) to the DCD Server

3. The DCD Server process the UsageTrackingReport()
4. The DCD Server MAY send a CH-1 EventRequest to Charging Enabler
5. The Charging Enabler acknowledges with a CH-1 Response message

6.2.2.11 Error Handling

Error! Reference source not found.Figure 14 shows the interaction between the DCD Server and the Charging Enabler for the error handling when the charging is handled by the DCD Server. The case where the charging is supported by the Content Provider is out of scope of this specification

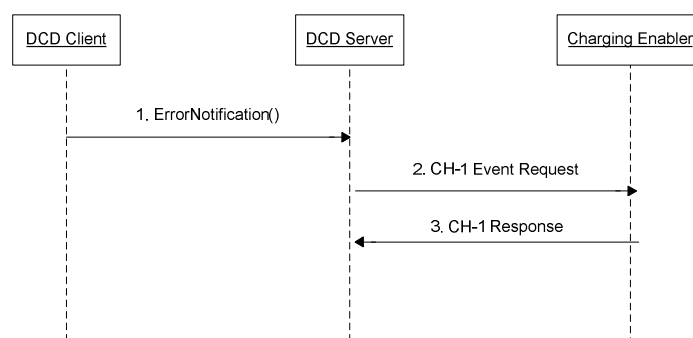


Figure 14: Offline Charging of an error notification

1. The DCD Server has received an ErrorNotification() message from the DCD Client for a content delivered
2. **The DCD Server sends an Event request to the Charging Enabler to report the issue**
3. The Charging Enabler acknowledges with a CH-1 Response message

6.2.3 Offline Session Charging for DCD

Not applicable.

6.3 DCD Online Charging Scenarios

6.3.1 Basic Principles

The charging models as given in chapter 6.1 SHALL be supported for online charging.

These charging requests SHALL contain distinct service usage data for any of the described sub-services.

The Charging Request messages to be sent from a DCD Server are described in the following table.

OMA Charging message	Trigger
CH-2 Initial Request	A subscription notification (for an externally triggered channel subscription) from a Content Provider is received
	Immediately prior to sending a ContentUpdateResponse() if delivery confirmation is supported
	Immediately prior to sending a ContentUpdatePush() if delivery confirmation is supported
	A ContentSubmitRequest() is received
CH-2 Update Request	Not applicable
CH-2 Termination Request	A ChannelSubscriptionResponse() is sent (for an externally triggered channel subscription)
	A ContentDeliveryConfirmation() is received
	A ContentUpdateResponse() is received from a Content Provider
CH-2 Balance Check Request	Usage not specified
CH-2 Price Enquiry Request	Usage not specified
CH-2 Direct Debit Request	A ChannelSubscriptionRequest() for a DCD Internal Subscription is received and successfully processed
	A ChannelSubscriptionRequest() for an unregistered is received and the channel is successfully registered
	Immediately prior to sending a ContentUpdateResponse() if delivery confirmation is not supported
	Immediately prior to sending a ContentUpdatePush() if delivery confirmation is not supported
CH-2 Refund Request or Direct Debit Request (TBC)	An ErrorNotification() related to content delivery is received

Table 3: The Charging Request Messages Triggered by Methods for DCD

6.3.2 Online Event Charging for DCD

6.3.2.1 DCD Internal Subscription

Figure 15 shows the interaction between the DCD Server and the Charging Enabler within a DCD internal subscription flow where the subscription validation and the charging are handled by the DCD Server. The cases where the subscription and the charging are supported by the Content Provider are out of scope of this specification

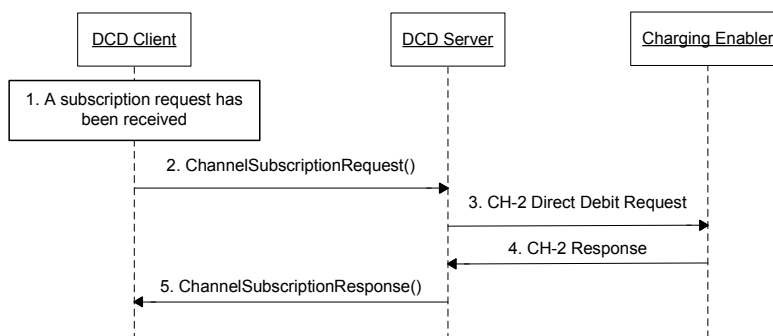


Figure 15: Online Charging of DCD Internal Subscription

1. The DCD Client has received a subscription request for a content channel (e.g. The DCD Enabled Client Application sends a SubscriptionRequest() message to the DCD Client)

2. The DCD Client sends a ChannelSubscriptionRequest() message to the DCD Server
3. **If the subscription is accepted by the DCD Server, the DCD Server SHALL send a CH-2 Direct Debit Request to the Charging Enabler**
4. **The Charging Enabler acknowledges with a CH-2 Response message**
5. In case of successful debit operation, the DCD Server sends a Channel subscription response to the DCD Client

6.3.2.2 DCD External Subscription to a Registered Channel

In the *external subscription*, the channel subscription is triggered externally to DCD Enabler (e.g. web browser).

Figure 16 shows the interaction between the DCD Server and the Charging Enabler within a DCD external subscription flow where the charging is handled by the DCD Server. The case where the charging is supported by the Content Provider is out of scope of this specification

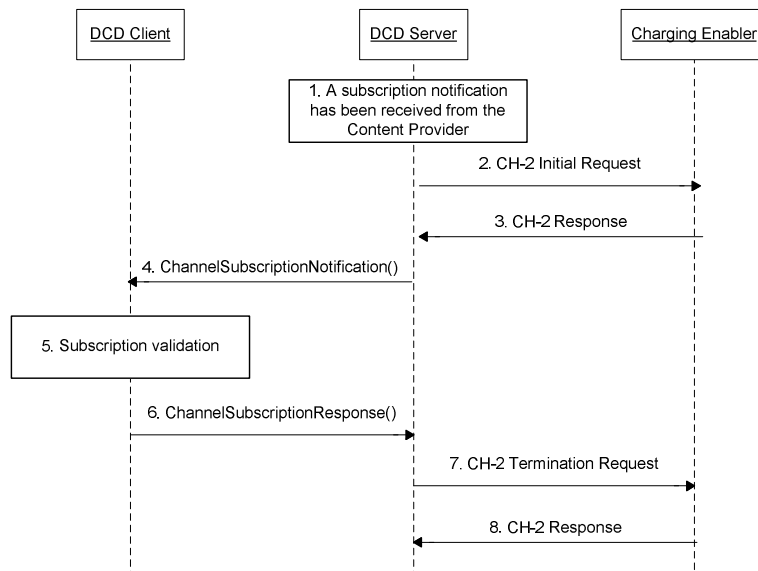


Figure 16: Online Charging of DCD External Subscription to a Registered Channel

1. The DCD Server has received a subscription notification from the Content Provider to inform him that a customer has requested a subscription (e.g. the Content Provider has sent a SubscriptionNotification() message to the DCD Server).
2. **The DCD Server checks with the Charging Enabler that the user has sufficient units and reserves the requested units for the content.**
3. **The Charging Enabler acknowledges with a CH-2 Response message including the result of the credit reservation.**
4. If the credit reservation was successful, the DCD Server sends a ChannelSubscriptionNotification() message to verify that the customer has requested for this subscription
5. The subscription request is confirmed or denied (e.g. The DCD Client verify the subscription with the DECA using the SubscriptionStatusUpdate() message)
6. The DCD Client sends the ChannelSubscriptionResponse() message to the DCD Server with the subscription status
7.
 - 7a. **If the subscription has been confirmed, the DCD Server SHALL send a CH-2 Termination Request to the Charging Enabler to debit the used units**

7b. If the subscription has not been confirmed, the DCD Server SHALL send a CH-2 Termination Request to the Charging Enabler to release the reserved units

8. The Charging Enabler acknowledges with a CH-2 Response message

6.3.2.3 DCD External Subscription to an Unregistered Channel

In this case, The DCD Client receives a subscription to a channel not yet registered with the DCD Service Provider (i.e. the channel doesn't have channel-ID assigned).

Figure 17 shows the interaction between the DCD Server and the Charging Enabler within a DCD external subscription flow to an unregistered channel, where charging is handled by the DCD Server. The case where the charging is supported by the Content Provider is out of scope of this specification

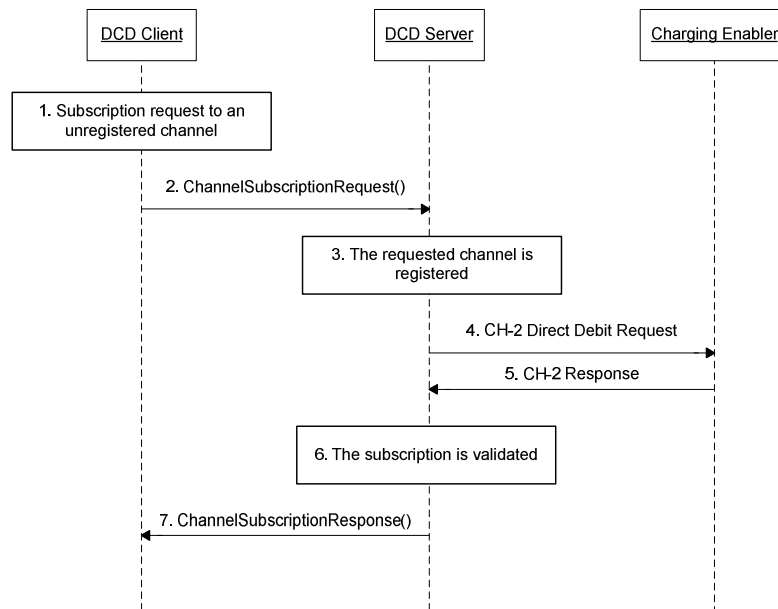


Figure 17: Online Charging of DCD External Subscription to an Unregistered Channel

1. The DCD Client has received a subscription request to an unregistered channel (e.g. The DECA has sent a SubscriptionRequest() message to the DCD Client)
2. The DCD Client sends a ChannelSubscriptionRequest() message to the unregistered channel to the DCD Server
3. The requested channel is registered. This registration could have been initiated by the DCD Server or by the Content Provider.
4. **The DCD Server SHALL send a CH-2 Direct Debit Request message towards the Charging Enabler**
5. **The Charging Enabler acknowledges with a CH-2 Response message**
6. If the debit has been successful, the subscription is validated
7. The DCD Server sends a subscription confirmation to the DCD Client

6.3.2.4 DCD Unsubscription requested by the DCD Client

Figure 18 shows the interaction between the DCD Server and the Charging Enabler within a DCD unsubscription flow where the subscription management and the charging are handled by the DCD Server. The cases where the subscription and the charging are supported by the Content Provider are out of scope of this specification

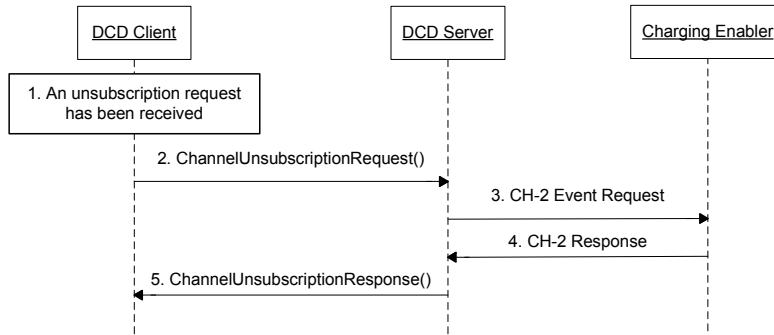


Figure 18: Online Charging of DCD Unsubscription initiated by the DCD Client

1. The DCD Client has received an unsubscription request for a content channel (e.g. The DCD Enabled Client Application has sent an UnsubscriptionRequest() message to the DCD Client)
2. The DCD Client sends a ChannelUnsubscriptionRequest() message to the DCD Server
3. **When the unsubscription is handled by the DCD Server, the DCD Server SHALL send a CH-2 Event Request to the Charging Enabler**
4. **The Charging Enabler acknowledges with a CH-2 Response message**
5. The DCD Server sends a ChannelUnsubscriptionResponse() message to the DCD Client

6.3.2.5 DCD Unsubscription requested by the Content Provider

Figure 19 shows the interaction between the DCD Server and the Charging Enabler within a DCD unsubscription flow where the subscription management and the charging are handled by the DCD Server. The cases where the subscription and the charging are supported by the Content Provider are out of scope of this specification

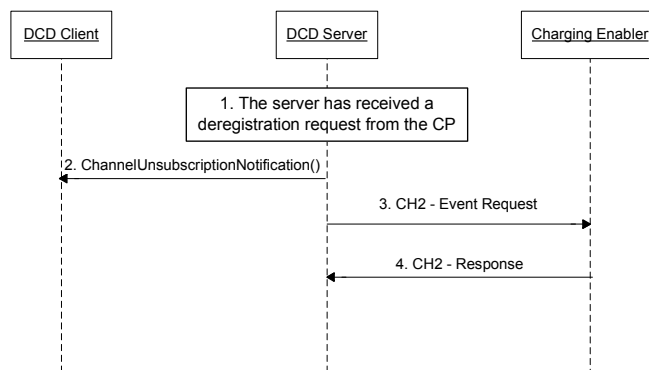


Figure 19: Online Charging of DCD Unsubscription initiated by the CP

1. The DCD Server has received a deregistration request from the Content Provider for a subscribed channel
2. The DCD Server sends a ChannelUnsubscriptionNotification() message to the DCD Client
3. **The DCD Server SHALL send a CH-2 EventRequest to the Charging Enabler**
4. **The Charging Enabler acknowledges with a CH-2 Response message**

6.3.2.6 Pull Content Delivery Method

DCD Pull Content Delivery can be initiated by the DCD Enable Client Application (e.g. upon user request), by the DCD Client (e.g. based on delivery scheduled) or by the DCD Server (e.g. based on a content notification). In all cases the DCD Client requests content update to the DCD Server that can forward the request to the Content Provider or may already have available updated content.

6.3.2.6.1 Pull Content Delivery Method without Confirmation

Figure 20 shows the interaction between the DCD Server and the Charging Enabler for the Pull Content Delivery use case

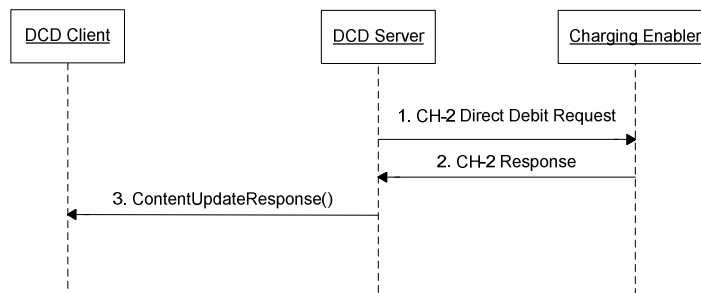


Figure 20: Online Charging for Pull Content Delivery without Confirmation

1. **Immediately prior to sending a ContentUpdateResponse to the DCD Client, the DCD Server sends a CH-2 Direct Debit Request to the Charging Enabler**
2. **The Charging Enabler acknowledges with a CH-2 Response message**
3. In case of successful debit operation, the DCD Server sends the new content to the DCD Client

6.3.2.6.2 Pull Content Delivery Method with Confirmation

Figure 21 shows the interaction between the DCD Server and the Charging Enabler for the Pull Content Delivery use case

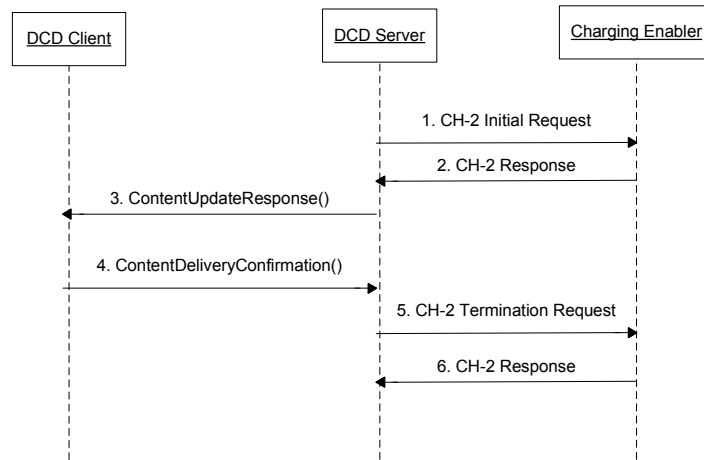


Figure 21: Online Charging for Pull Content Delivery with Confirmation

1. **Immediately prior to sending a ContentUpdateResponse to the DCD Client, the DCD Server checks with the Charging Enabler that the user has sufficient units and reserves the requested units for the content**
2. **The Charging Enabler acknowledges with a CH-2 Response message including the result of the credit reservation.**
3. In case of successful credit reservation, the DCD Server sends the new content to the DCD Client
4. The DCD Client informs the DCD Server of the successful content delivery
5. **The DCD Server sends a CH-2 Termination Request message to the Charging Enabler to debit the used units.**
6. **The Charging Enabler acknowledges the debit with a CH-2 Response message**

6.3.2.7 Push Content Delivery method

When the user has subscribed to a channel that supports the Push Method, and a new content becomes available, the DCD Server automatically sends the content or a link to it (i.e. without requiring the Client to request it)

6.3.2.7.1 Content Push without delivery confirmation

Figure 22 shows the interaction between the DCD Server and the Charging Enabler when the DCD Server pushes an updated content

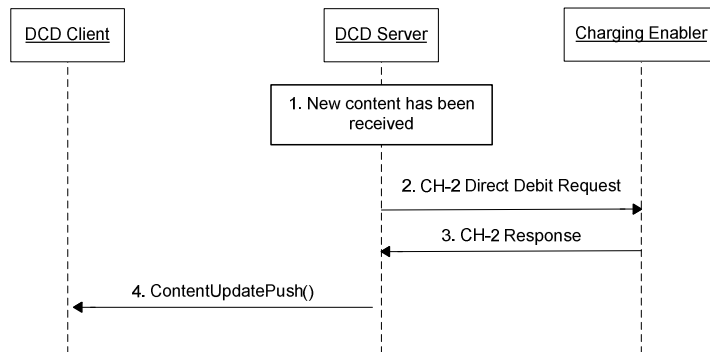


Figure 22: Online Charging for Content Push without Delivery Confirmation

1. The DCD Server has received a new content (e.g. a DCD Content Provider sent a ContentUpdate() message)
2. **The DCD Server sends a CH-2 Direct Debit Request to the Charging Enabler**
3. **The Charging Enabler acknowledges with a CH-2 Response message**
4. If the direct debit operation was successful, the DCD Server sends the content to the DCD Client

6.3.2.7.2 Content Push with delivery confirmation

Figure 23 shows the interaction between the DCD Server and the Charging Enabler when the DCD Server pushes an updated content

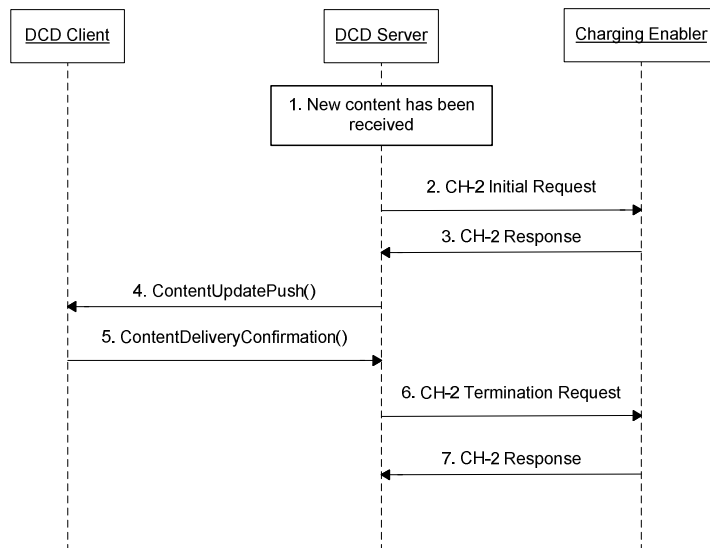


Figure 23: Online Charging for Content Push with Delivery Confirmation

1. The DCD Server has received a new content (e.g. a DCD Content Provider sent a ContentUpdate() message)
2. **The DCD Server checks with the Charging Enabler that the user has sufficient units and reserves the requested units for the content**
3. **The Charging Enabler acknowledges with a CH-2 Response message**
4. In case of successful credit reservation, the DCD Server sends the content to the DCD Client
5. The DCD Client sends a ContentDeliveryConfirmation() message to the DCD Server
6. **The DCD Server sends a CH-2 Termination Request message to the Charging Enabler to debit the used units**
7. **The Charging Enabler acknowledges the debit with a CH-2 Response message**

6.3.2.8 Content Submission

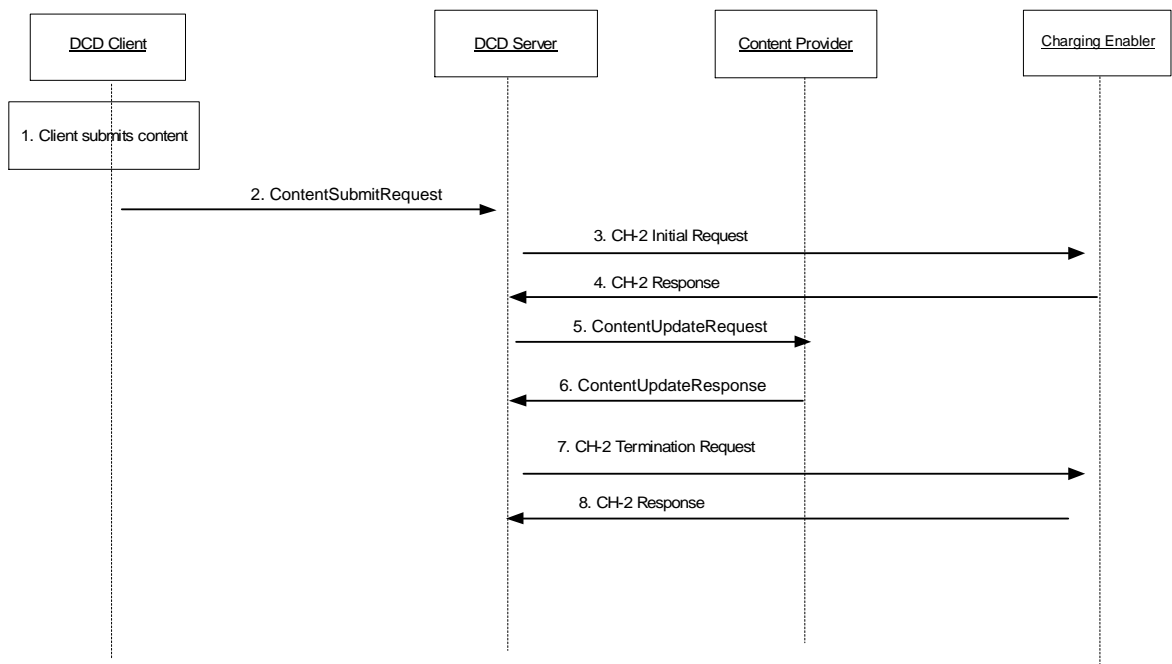


Figure 24: Online Charging for Content Submission

1. The DCD Client submits content (eg the DECA has sent a ContentSubmitRequest())
2. The DCD Client forwards this request to the DCD Server
3. The DCD Server checks with the Charging Enabler that the user has sufficient units and reserves the requested units for the content
4. The Charging Enabler acknowledges with a CH-2 Response message including the result of the Credit Reservation
5. If Credit Reservation was successful, DCD server sends ContentUpdateRequest which include parameters from ContentSubmitRequest message to the Content Provider
6. The DCD server receives ContentUpdateResponse from Content Provider
7. DCD Server shall send a CH-2 Termination Request to the Charging Enabler to debit the used units
8. The Charging Enabler acknowledges with a CH-2 Response message

6.3.2.9 Error Handling

Figure 25 shows the interaction between the DCD Server and the Charging Enabler for the error handling when the charging is handled by the DCD Server. The case where the charging is supported by the Content Provider is out of scope of this specification.

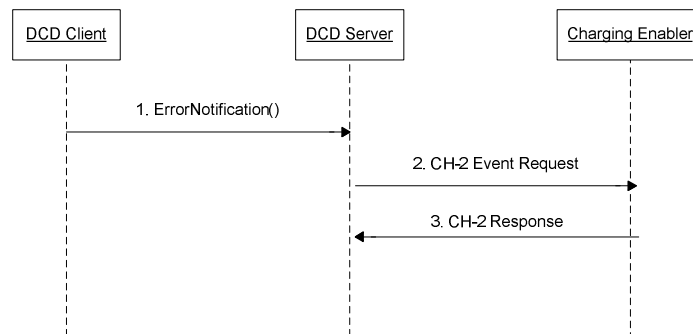


Figure 25: Online Charging of an error notification

1. The DCD Server has received an ErrorNotification() message from the DCD Client for a content delivered
2. **The DCD Server sends an Event request to the Charging Enabler to report the issue with the Termination Cause [SERVICE_NOT_PROVIDED]**
3. The Charging Enabler acknowledges with a CH-2 Response message

6.3.3 Online Session Charging for DCD

Not applicable.

7. DCD Charging Information

The following tables identify the DCD parameters used for the purposes of subscription, content delivery, usage report and error handling charging. The last column provides the mapping to the corresponding OMA Charging Data Element(s), which carry charging related information pertinent to a specific charging event.

DCD Parameter Name	Category	Type	Description	OMA Charging Data Element	Usage
Value: DCD@openmobilealliance.org	O _M	String	Fixed value to identify the service specification in the context of which the charging events must be interpreted.	Service Context Id	
Message-type	O _M	Enumerated	Identifies more precisely the type of service within the context defined by the Service Context Id, SUBSCRIBE*) UNSUBSCRIPTION*) CONTENT_SUBMIT**) CONTENT_PUSH_DELIVERY**) CONTENT_PULL_DELIVERY**) USAGE_TRACKING_REPORT**)		*)Used for Subscription Charging only **)Used for Content Delivery Charging only
User ID	O _M	String	Holds the identity of the party that the charging information relates to.	Subscription Id	
Content provider ID	O _C	String	The globally unique identity of the content provider within the DCD Server Domain		
Channel-ID	O _C	String	ID to uniquely identify a channel inside the DCD Server Domain	Service Key	
Content-ID	O _C	String	Identifier sets by the Content Provider, and unique within the DCD Service Provider's domain		Used for Content Delivery Charging only
Content Price	O _C	Group	Amount to be reserved/debited from the end-user's account. In case of reservation, the listed data elements must be included in the requested service units data element. In case of reporting units to be debited, the used service units data element must be used in the charging interface.	Money	Used for Content Delivery Charging only
Channel Subscription Price	O _C	Group	Amount to be reserved/debited from the end-user's account. In case of reservation, the listed data elements must be included in the requested service units data element. In case of reporting units to be debited, the used service units data element must be used in the charging interface.	Money	Used for Subscription Charging only
cost information	O _C	String	Information for presentation purpose that may contain the price and pricing conditions		
Usage-Count	O _C	String	Number of times policy-related content items were accessed.		Used for Content Delivery Charging only

Table 4: DCD Charging Information

Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
n/a	n/a	No prior version –or- No previous version within OMA

A.2 Draft/Candidate Version 1.0 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-TS-DCD_Charging-V1_0	09 Oct 2007	All	First baseline
	09 Nov 2007	All	OMA-MCC-DCD_Charging-2007-0013-CR_AddingBestPractise_template OMA-MCC-DCD_Charging-2007-0010R01-CR_Subscription_Charging OMA-MCC-DCD_Charging-2007-0011R01-CR_Content_Delivery_Charging OMA-MCC-DCD_Charging-2007-0012R02-CR_Online_Charging_for_Subscription_ OMA-MCC-DCD_Charging-2007-0014-CR_Subscription_related_Chargeable_Events OMA-MCC-DCD_Charging-2007-0015-CR_definitions_for_DCD_charging_TS
	27 Feb 2008	All	OMA-MCC-DCD_Charging-2007-0023R02-CR_Charging_Architecture OMA-MCC-DCD_Charging-2007-0024R01-CR_Scope_and_Introduction OMA-MCC-DCD_Charging-2007-0025R02-CR_6.1_Event_Charging_Principles_ OMA-MCC-DCD_Charging-2007-0027R01-CR_6.1_Session_Charging_Principles OMA-MCC-DCD_Charging-2007-0030-CR_6.2.2.1_Editorial_Change_ OMA-MCC-DCD_Charging-2007-0032R01-CR_Ch6_DCD_Charging_Principles OMA-MCC-DCD_Charging-2007-0033R01-CR_DCD_charging_parameters OMA-MCC-DCD_Charging-2007-0035R01-CR_Editorial_updates OMA-MCC-DCD_Charging-2007-0036-CR_Offline_Charging_Content_Delivery OMA-MCC-DCD_Charging-2007-0037-CR_Chargeable_Events_related_to_Content_Delivery
	14 Apr 2008	All	OMA-MCC-DCD_Charging-2008-0001-CR_DCD_Charging_Abbreviations OMA-MCC-DCD_Charging-2008-0002-CR_DCD_Charging_Introduction OMA-MCC-DCD_Charging-2008-0004R01-CR_Change_to_DCD_charging_info OMA-MCC-DCD_Charging-2008-0006-CR_Content_Notif_Removal OMA-MCC-DCD_Charging-2008-0007-CR_Online_Charging_Content_Notif_Removal OMA-MCC-DCD_Charging-2008-0008-CR_Ext_Subscription_Refused OMA-MCC-DCD_Charging-2008-0009R02-CR_Error_Notification OMA-MCC-DCD_Charging-2008-0010R01-CR_ContentSubmission_Charging OMA-MCC-DCD_Charging-2008-0011-CR_Content_Update_Online_Charging OMA-MCC-DCD_Charging-2008-0012-CR_Content_Notif_Removal

Document Identifier	Date	Sections	Description
	19 Jun 2008	6.2.2.4 7 6.1.1	OMA-MCC-DCD_Charging-2008-0014- CR_Content_Update_Offline_Charging OMA_MCC_DCD_Charging-2008-0015R01- CR_Charging_Information OMA-MCC-DCD-Charging-2008-0016R01-CR_Chargeable-Events
	24 Jun 2008	7	OMA-MCC-DCD_Charging-2008-0020- CR_Merging_tables_on_Charging_Information OMA-MCC-DCD_Charging-2008-0022- CR_Category_in_Charging_Info
	25 Jun 2008	2, 3.2, 6, 6.1, 6.3.1	OMA-MCC-DCD_Charging-2008-0021- CR_Editorial_updates_and_TS_revision_20080624
	26 Jun 2008	6.2.2.7 7 Appendix B	OMA-MCC-DCD_Charging-2008-0018R01- CR_DCD_Usage_Tracking_Report_charging OMA-MCC-DCD_Charging-2008-0025- CR_SCR_and_Usage_Tracking_Report_Info
	15 Sep 2008	6.2.2.4 6.2.2.5 6.2.2.6 6.3.2.4 6.3.2.5	OMA-MCC-DCD_Charging-2008-0027-CR_Unsubscribe
	21 Oct 2008	6.2.2.2 6.2.2.3	OMA-MCC-DCD_Charging-2008-0028R01
Candidate Version: OMA-TS-DCD_Charging-V1_0	23 Dec 2008	All	Status changed to Candidate by TP OMA-TP-2008-0493- INP_DCD_V1_0_ERP_for_Candidate_Approval

Appendix B. Static Conformance Requirements (Normative)

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

B.1 SCR for Charging Enabler User (DCD Server)

Item	Function	Reference	Requirement
CEU-C-001-O	Online charging	Section 5	
CEU-C-002-O	Offline charging	Section 5	
CEU-C-003-O	Subscription Based charging	Section 6.1.1	
CEU-C-004-O	Consumption Based charging	Section 6.1.1	

B.2 SCR for Charging Enabler (Charging Server)

Item	Function	Reference	Requirement
CE-S-001-O	Online charging	Section 5	
CE-S-002-O	Offline charging	Section 5	
CE-S-003-O	Subscription Based charging	Section 6.1.1	
CE-S-004-O	Consumption Based charging	Section 6.1.1	