



# Customized Multimedia Ringing Architecture

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**Open Mobile Alliance**  
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# 1. Scope

**(Informative)**

This document describes the architecture designed to fulfil the requirements outlined in the Customized Multimedia Ringing Requirements document [OMA-CMR-RD]. The description of the architecture comprises the definition of functional components and the interfaces used or exposed by these functional components.

## 2. References

### 2.1 Normative References

- [OMA-CMR-RD] “Customized Multimedia Ringing Requirements”, Open Mobile Alliance™, OMA-RD-CMR-V1\_0, URL:<http://www.openmobilealliance.org/>
- [OMA-DICT] “Dictionary for OMA Specifications”, Version 2.8, Open Mobile Alliance™, OMA-ORG-Dictionary-V2\_8, URL:<http://www.openmobilealliance.org/>
- [OMA-LOCSIP] “Location in SIP/IP core”, Open Mobile Alliance™, OMA-ERP-LOCSIP-V1\_0, URL:<http://www.openmobilealliance.org/>
- [OMA-MLS-AD] “Mobile Location Service Architecture”, Open Mobile Alliance™, OMA-AD-MLS-V1\_2, URL:<http://www.openmobilealliance.org/>
- [OMA-PRS-AD] “Presence SIMPLE Architecture”, Open Mobile Alliance™, OMA-AD-Presence\_SIMPLE-V1\_1, URL:<http://www.openmobilealliance.org/>
- [OMA-XDM-AD] “XML Document Management Architecture”, Open Mobile Alliance™, OMA-AD-XDM-V1\_1, 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>

### 2.2 Informative References

- [OMA-SEC-CF] “OMA Application Layer Security Common Functions V1.0”, Open Mobile Alliance™, OMA-ERP-SEC\_CF-V1\_0, URL:<http://www.openmobilealliance.org/>
- [OMA-Charging-AD] “Charging Architecture”, Version 1.0, Open Mobile Alliance™, OMA-AD-Charging-V1\_0, 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

<b>CMR End User</b>	A CMR End User is an individual who experiences the CMR service. A CMR End User could be any end user, including CMR Subscriber.
<b>CMR Resource</b>	Any multimedia content such as audio, video, text, picture, VCard or their combination. They are provided by the CMR Subscriber or CP and should be authenticated by SP.
<b>CMR Resource Metadata</b>	Information used to characterize a particular CMR Resource, e.g. media type, resource code, resource name, resource copyright owner, etc.
<b>CMR Resource Box</b>	A logical resource package which represents multiple CMR Resources with the same media type and with the associated predefined rule of selecting a CMR Resource from the box to present.  A Resource Box is equivalent to a single CMR Resource for purchasing/copying/deleting/modifying.
<b>CMR Subscriber</b>	A CMR Subscriber is an individual who has subscribed CMR enabled services. A CMR Subscriber can manage his/her service data, e.g. Personal Resource Library and Preference Settings.
<b>Content Provider</b>	See [OMA-DICT]
<b>Entity</b>	See [OMA-DICT]
<b>IMS</b>	See [OMA-DICT]
<b>Interface</b>	See [OMA-DICT]
<b>Location Client</b>	See [OMA-LOCSIP]
<b>Location policy XDMS</b>	See [OMA-LOCSIP]
<b>Location Server</b>	See [OMA-LOCSIP]
<b>MLS Client</b>	See [OMA-MLS-AD]
<b>Personal Resource Library</b>	Set of CMR Resources available for a particular CMR Subscriber which are subject to be used in the CMR service. This library could contain the list of resources and associated information, e.g. expiry time. This library could be managed by the CMR Subscriber (e.g. purchase a new resource; delete an old one, etc).
<b>Preference Settings</b>	Set of rules that specify which (e.g. different CMR Resources for different calling party groups), when (e.g. under a particular event) and how (e.g. playing sequence of resources in a CMR Resource Box) CMR Resource should be presented in CMR services.
<b>Presence Server</b>	See [OMA-PRS-AD]
<b>Reference Point</b>	See [OMA-DICT]
<b>Resource List Server</b>	See [OMA-PRS-AD]
<b>Service Provider</b>	See [OMA-DICT]
<b>Target</b>	See [OMA-LOCSIP]
<b>Watcher</b>	See [OMA-PRS-AD]

### 3.3 Abbreviations

<b>CMR</b>	Customized Multimedia Ringing
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<b>CP</b>	Content Provider
<b>CS</b>	Circuit Switch
<b>DTMF</b>	Dual Tone Multiple Frequency
<b>IMS</b>	IP Multimedia Subsystem
<b>MLS</b>	Mobile Location Service
<b>OMA</b>	Open Mobile Alliance
<b>RLS</b>	Resource List Server
<b>SIP</b>	Session Initiation Protocol
<b>SP</b>	Service Provider
<b>XDM</b>	XML Document Management
<b>XDMC</b>	XML Document Management Client
<b>XDMS</b>	XML Document Management Server

## 4. Introduction

**(Informative)**

The Customized Multimedia Ringing (CMR) Enabler is expected to enhance a CMR End User's experience through presenting the customised multimedia resources instead of the traditional ring back tone or ringing tone according to a specified event, e.g. the establishment of a call, the arrival of a message or mail.

This document defines the architecture of the CMR Enabler based on the requirements defined in [OMA-CMR-RD].

The CMR Enabler is designed to be useable by various network technologies (i.e. network types and/or bearers).

### 4.1 Version 1.0

This version of architecture document covers all requirements of [OMA-CMR-RD].



## 5. Architectural Model

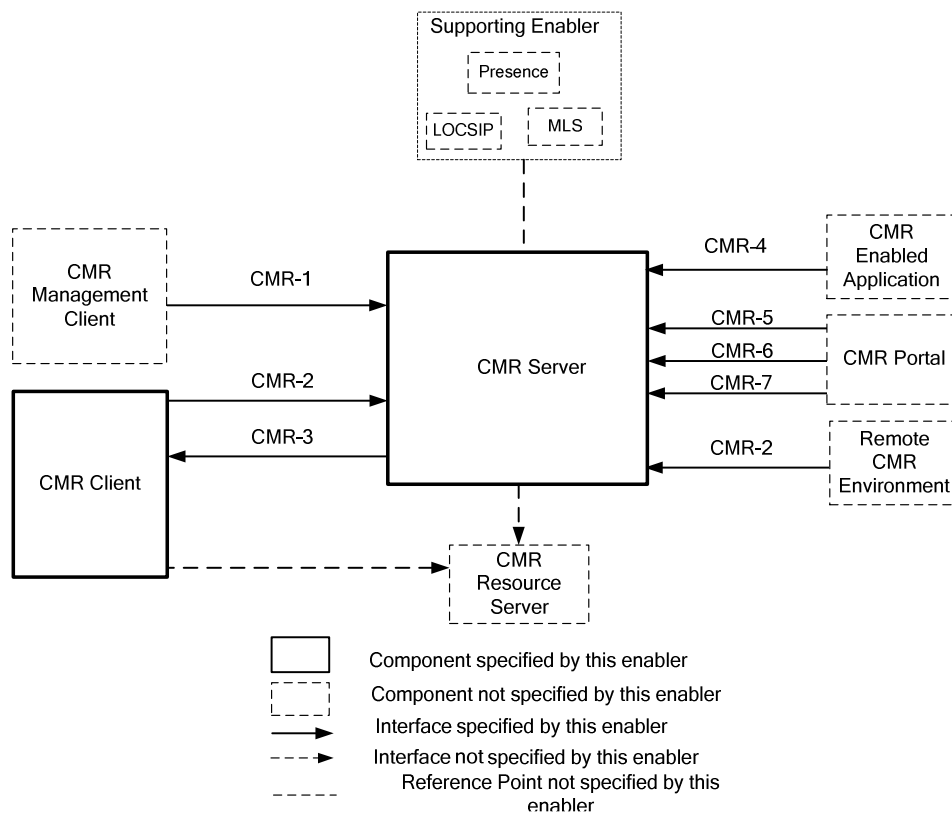
### 5.1 Dependencies

The CMR Enabler depends on technologies provided by other external OMA Enablers, including the following:

- Presence technology: Presence Enabler as described in [OMA-PRS-AD]
- XML document management technology: XDM Enabler as described in [OMA-XDM-AD]
- Location technology: Location Enabler as described in [OMA-MLS-AD]
- Charging technology: Charging Enabler as described in [OMA-Charging-AD]
- Location in SIP/IP Core: Location Enabler as described in [OMA-LOCSIP]

### 5.2 Architectural Diagram

Figure 1 describes the Functional Components and Interfaces of the CMR Enabler. The Functional Components and Interfaces in the CMR Enabler Architecture are described in depth in section 5.3.



**Figure 1: CMR Enabler architecture**

The CMR Server interacts with supporting Enablers, e.g. Location Enabler, Presence Enabler for fulfilling specific CMR enabler requirements. The interactions between the CMR Enabler and these supporting Enablers are described in Appendix C.

## 5.3 Functional Components Definition

### 5.3.1 CMR Functional Components

#### 5.3.1.1 CMR Server

The CMR Server implements the network side of the CMR Enabler and provides the functions as described in the subsequent sections.

##### 5.3.1.1.1 Service Management Function

The Service Management Function has the responsibility for the following actions.

- Management(e.g. query/add/update/delete) of the CMR Subscriber's Preference Settings, the Preference Settings include(but not limited to):
  - Default CMR Resources
  - Preference rules based on different criteria and the combination of the criteria including: group, time/date, presence and location information etc.
  - The priority setting for different criteria
  - The presenting priority when both calling and called party are CMR Subscriber
  - CMR Resource filter rules
  - Presentation control settings (e.g. stopping/continuing CMR presentation upon a particular event)
- Management of the CMR Subscriber's Personal Resource Library, including(but not limited to):
  - Subscribing/deleting/renewing subscription of the CMR resource and CMR Resource Box
  - Copy the CMR Resources from other CMR Subscriber's Personal Resource Library off-line( e.g. copy the CMR Resources enjoyed in the just finished communication) or on-line (during the presentation) subject to the CMR Resource owner's privacy
  - Subscribing CMR Resource for other Subscribers (i.e. adding the resource to the other CMR Subscriber's Personal Resource Library)
  - Providing notification message to CMR Subscriber when CMR Resource subscription will expire within certain time frame or has expired.
- System settings management(e.g. query/add/update/delete)
- Service subscription management
- Record of CMR service management activities and provide the related report upon the request received

##### 5.3.1.1.2 Resource Management Function

The Resource Management Function has the responsibility for the following actions.

- Storage of CMR Resource metadata and CMR Resource Box information
- CMR Resource property(metadata) management, the metadata may include (but not limited to):
  - Media type, resource name, resource price, resource provider, life cycle, status (availability), etc.
- CMR Resource Box management, including (but not limited to):
  - The list of CMR Resources in the CMR Resource Box
  - CMR Resource Box metadata
  - Presentation mode of CMR Resources in the CMR Resource Box
- Record of CMR Resource management activities and provide the related report upon the request received

### 5.3.1.1.3 CMR Resource Delivery and Presentation Control Function

The Presentation Control Function has the responsibility for the following actions.

- Proper CMR Resource selection/generation as per CMR Subscriber's Preference Settings, per event
- CMR Resource presentation
  - Control CMR Resource (audio/video type) presentation by interaction with CMR Resource Server
  - Support early media negotiation and delivery in SIP/IP core network
  - Send the URI of the CMR Resources to the CMR Client in SIP/IP core network
- CMR Resource presentation control
  - Support receiving the dynamic presentation control requests (e.g. filtering) from other CMR Entities (e.g. CMR Client, other CMR Server) and check the pre-configured presentation control settings (e.g. continue) on the CMR Server
  - Handle the presentation control requests by controlling the CMR Resource playing through the interactions with CMR Resource Server, e.g. stop playing CMR Resource
  - Send/forward the presentation control request to the Remote CMR Environment ( e.g. other CMR Server)
- Dynamic information acquisition
  - Collect CMR Subscriber's location information by interacting with the Location enabler
  - Collect CMR Subscriber's presence information by interacting with the Presence enabler
  - Collect DTMF digits from CMR Resource Server for presentation control and online copy functions and forward the online copy request to the service management function
- Collect and storage of CMR Resource usage information and provide the related report upon the request received

### 5.3.1.2 CMR Client

The CMR Client resides in the CMR End User's Device.

The CMR Client supports the following functions (but not limited to):

- Interact with CMR Server for requesting CMR services possibly with presentation control indication (e.g. filter indication )
- Support out-band method by interaction with CMR Server for presentation control and online copy function
- Support in-band method by interaction with CMR Resource Server for presentation control and online copy function
- CMR Resource presentation
  - Establish media channel with CMR Resource Server, receive and present CMR Resources
  - Retrieve the CMR Resources from CMR Resource Server using URIs received from CMR Sever and present the CMR Resources locally

## 5.3.2 External Functional Components

### 5.3.2.1 CMR Resource Server

The CMR Resource Server supports the following functions (but not exhaustive)

- Supports media storage and processing (e.g. audio/video transcoding) of CMR Resources
- Play the CMR Resource to the CMR Client on the request of the CMR Server by using existing technologies, for example, delivery of audio/video CMR Resources by using the standard functions of the underlying infrastructure

- Send the CMR Resource on the request of the CMR Client using standard protocols (e.g. HTTP)
- Support in-band method to collect DTMF digits from CMR Client and send the collected information to the CMR Server for online copy and some presentation control functions

Note: The CMR Resources are controlled by the SPs for security reasons, e.g. the SPs should check the CMR Resources before they are uploaded to the CMR Resource Server. How the SPs control the CMR Resources is subjected to SPs' policies and is not specified in this specification.

### 5.3.2.2 CMR Portal

CMR Portal is provided to the CMR Subscriber/CP/SP for CMR Resource metadata management and service management.

CMR Portal aggregates access to CMR Resource metadata and service data for easy reach to CMR Subscriber/CP/SP.

### 5.3.2.3 CMR Enabled Application

CMR Enabled Application is an external functional component that provides the CMR related service feature in its application by making use of the functionalities provided by the CMR Enabler. Other OMA Enabler can act as the CMR Enabled Application to invoke the interface exposed by CMR Enabler for using CMR functionalities.

### 5.3.2.4 CMR Management Client

The CMR Management Client resides in the CMR Subscriber's Device which is used by the CMR Subscriber to perform the personal CMR service management.

The CMR Management Client interacts with the CMR Server for:

- CMR Subscriber's Personal Resource Library Management, which may include (but not limited to):
  - Subscribing/deleting/ renewing subscription of the CMR Resource and CMR Resource Box
  - Copy the CMR Resources from other CMR Subscriber's Personal Resource Library off-line
  - Subscribing CMR Resource for other CMR Subscribers (i.e. add the resource to the other CMR Subscribers' Personal Resource Libraries)
  - Receiving CMR Resource subscription expiration notification from CMR Server when CMR Resource subscription will expire or has expired.
- CMR Subscriber's Preference Settings management, the Preference Settings include:
  - Default CMR Resources
  - Preference rules based on different criteria and the combination of the criteria including group, time/date, presence and location information etc.
  - The priority setting for different criteria
  - The presenting priority when both calling and called party are CMR Subscribers
  - CMR Resource filter rules
  - Presentation control settings (e.g. stopping/continuing CMR presentation upon a particular event)
- CMR Resource metadata and CMR Resource Box management

### 5.3.2.5 Remote CMR Environment

The Remote CMR Environment is the CMR environment residing in another (remote) network.

This Remote CMR Environment is a mirror of the environment described in this document, and can contain the full set of CMR functional components described in this document or a subset thereof.

An example of the interaction between the CMR Enabler and the Remote CMR Environment is that the CMR Server of calling party interacts with the CMR Server of the called party for some presentation control functions (e.g. filter function) when calling party and called party CMR Subscribers belong to different CMR Servers.

### 5.3.3 Description of the Interfaces

#### 5.3.3.1 CMR-1

The CMR-1 Interface is exposed by the CMR Server.

The CMR-1 Interface is used by the CMR Management Client to send service management requests initiated by a CMR Subscriber to the CMR Server and receive the responses from the CMR Server. The supported functionalities of this Interface may include (but not limited to):

- Personal Resource Library management, e.g. purchase, off-line copy and delete the CMR Resources related to a specific CMR Subscriber etc.
- Preference Setting management e.g. query/create/modify/delete the presentation rules related to a specific CMR Subscriber
- Resource Management : manage CMR Resource metadata or CMR Resource Box

#### 5.3.3.2 CMR-2

The CMR-2 Interface is exposed by the CMR Server.

Based on the network capabilities, the CMR-2 Interface is used to by the CMR Client to (but not limited to):

- Send the call/session requests, which may contain CMR Client's media capabilities, presentation control indication (e.g. filtering/priority information)
- Receive the responses from the CMR Server, optionally containing the URIs of CMR Resources
- Send CMR presentation control (e.g. stop) and online copy requests during CMR Resource presentation

Based on the network capabilities, the CMR-2 Interface is also used by the Remote CMR Environment (typically remote CMR Server) to (but not limited to):

- Send the call/session requests, which may contain CMR Client's media capabilities, presentation control indication (e.g. filtering/priority information) and/or URIs of CMR Resources etc.
- Receive the responses from the CMR Server, optionally containing the URIs of CMR Resources

#### 5.3.3.3 CMR-3

The CMR-3 Interface is exposed by the CMR Client.

The CMR-3 Interface is used by the CMR Server to:

- Send the call/session requests to the CMR Client, the requests may contain CMR specific information, e.g. calling party's media information, URI of CMR Resources
- Receive the responses from the CMR Client

#### 5.3.3.4 CMR-4

The CMR-4 Interface is exposed by the CMR Server.

The CMR-4 Interface is used by the CMR Enabled Applications to (but not limited to):

- Request the CMR service (e.g. request the proper CMR Resource)

- Receive the response of the request

### 5.3.3.5 CMR-5

The CMR-5 Interface is exposed by the CMR Server.

The CMR-5 Interface is used by the CMR Portal to perform the CMR Resource metadata management and CMR Resource Box management.

### 5.3.3.6 CMR-6

The CMR-6 Interface is exposed by the CMR Server.

The CMR-6 Interface is used by the CMR Portal to perform the CMR service management, including (but not limited to):

- CMR Subscriber' Preference Settings (e.g. presentation rule management)
- CMR Personal Resource Library management
- Service subscription management
- CMR system setting management

### 5.3.3.7 CMR-7

The CMR-7 Interface is exposed by the CMR Server.

The CMR-7 Interface is used by the CMR Portal to request and deliver the service report, e.g. CMR Resource metadata management and CMR service management report.

## 5.3.4 Charging (Informative)

Appropriate charging mechanisms may need to be provided by the underlying network or other suitable entities in order to fulfill the charging requirements described in [OMA-CMR-RD]. One of such mechanisms is through the OMA Charging Enabler.

The OMA Charging Enabler [OMA-CHG-AD] coordinates charging data triggers and flow from OMA enablers into an underlying charging infrastructure, supporting online and offline charging. CMR entities that may optionally report Chargeable Events are:

- CMR Server

The interaction between CMR Server and the OMA Charging Enabler is described in Appendix C.

Description of how charging is performed is beyond the scope of the present specification.

## 5.4 Security Considerations

### 5.4.1 Authentication and Authorization

Network-independent mutual authentication mechanism between CMR Server and other entities (including CMR Client, CMR Management Client, CMR enabled Application, etc.) is needed. The security mechanism for authentication is specified in [OMA-SEC-CF].

- CMR Server (reusing SEC\_CF) authenticates the entities to make sure that only authorized entities are permitted to manage the Preference Settings, CMR Resources, subscription information, and so on. CMR Server (reusing SEC\_CF) authenticates CMR Subscriber by his/her identity (e.g. username/password). CMR Server (reusing SEC\_CF) authenticates CP/SP by the CP/SP identity (e.g. CPID or SPID/password)
- Entities (reusing SEC\_CF) also need to authenticate CMR Server to avoid some attacks, such as man-in-the-middle attack

In order to ensure that only authorized principals (including CMR Subscriber, CP, SP, etc.) are permitted to manage the Preference Settings or CMR Resources and control CMR Resource presentation, CMR Enabler may delegate authorization mechanisms to the Service Provider's deployment.

## 5.4.2 Data Integrity and Confidentiality

In order to protect the data (e.g. CMR Resources, Management Data) transferred in network against eavesdropping and modification, the CMR Enabler should be protected to ensure its data integrity and confidentiality. This protection should be subject to the CMR Subscriber's request and service provider's policies. A suitable mechanism for the data integrity and confidentiality is specified in [OMA-SEC-CF].

## Appendix A. Change History (Informative)

### A.1 Approved Version History

Reference	Date	Description
Approved Version OMA-AD-CMR-V1_0	20 Mar 2012	Status changed to Approved by TP: TP ref# OMA-TP-2012-0113-INP_CMV_V1.0_ERP_for_final_Approval



## Appendix B. Flows (informative)

### B.1 Online Copy Flow

In this example, the CMR Subscriber B allows his/her CMR Resources to be copied by other CMR Subscribers. This online copy flow is applicable when CMR End User A is also a CMR Subscriber and both CMR Subscribers belong to the same CMR Server. If a CMR End User sends copy request to CMR Server when he/she is not a CMR Subscriber, the CMR Server may trigger the subscription function and then execute the copy activity subject to SP's policy. The following flow only covers the copy flow when the CMR End User is a CMR Subscriber.

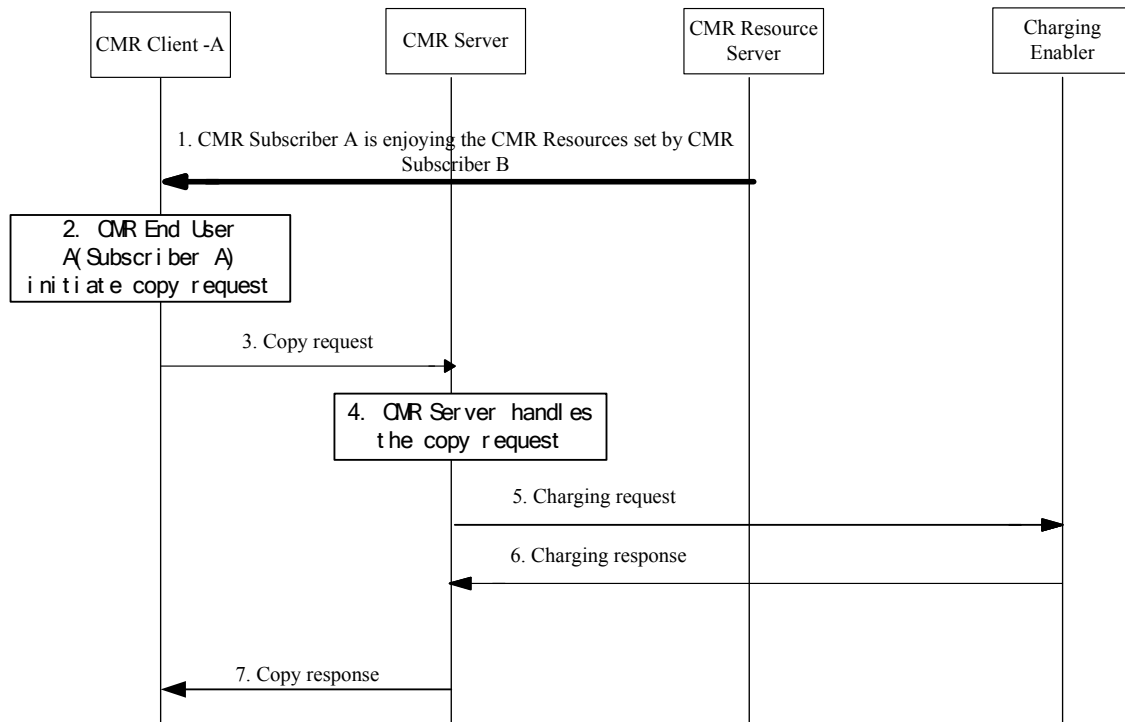


Figure 2: Online copy flow

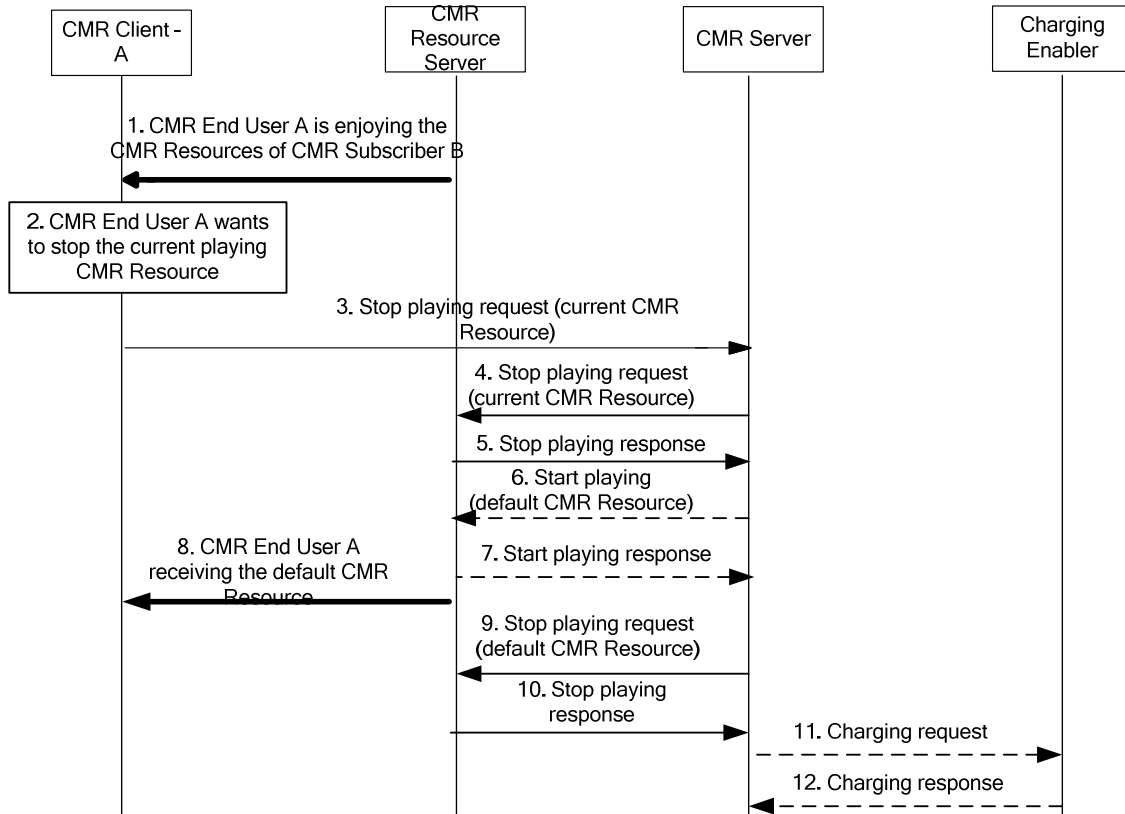
1. The Subscriber A (calling party) was engaged in a call with CMR Subscriber B (called party) and is enjoying the CMR Resources of CMR Subscriber B. The CMR Server records the currently presenting CMR Resources and the involved calling/called parties.
2. The Subscriber A wants to copy the CMR Resources he/she is experiencing and initiate the copy request
3. The CMR Client sends copy request to the CMR Server directly when out-band method is used or via CMR Resource Server when in-band method is used.
4. The CMR Server checks the privacy of the CMR Subscriber B , finds the currently presenting CMR Resources of CMR Subscriber B and then copies them to CMR Subscriber A's Personal Resource Library.
5. The CMR Server records the copy activity and sends the copy response to the CMR Client.

Note: The copy response is sent over other interfaces (e.g. SMS) when in-band method is used to send the copy request.

6. The CMR Server generates the charging event and sends the charging request to the Charging Enabler.
7. The Charging Enabler sends the charging response to the CMR Server.

## B.2 Presentation Control

This section provides the flow of stop operation as an example of the presentation control function.



**Figure 3: Presentation control (stop) flow**

1. The CMR End User A (calling party) was engaged in communication with CMR Subscriber B (called party) and is enjoying the CMR Resources of CMR Subscriber B.
2. The CMR End User A wants to stop the CMR Resources he/she is experiencing.
3. The CMR Client A sends stop request to the CMR Server directly when out-band method is used and via CMR Resource Server when in-band DTMF method is used.
4. The CMR Server requests the CMR Resource Server to stop playing the current CMR Resources.
5. The CMR Resource Server responds the stop request.
6. The CMR Server requests the CMR Resource Server to play the default CMR Resource.
7. The CMR Resource Server sends stop response to CMR Server.
8. The CMR Client A receives the default CMR Resource.
9. The CMR Server requests the CMR Resource Server to stop playing the default CMR Resource.
10. The CMR Resource Server responds the stop request.

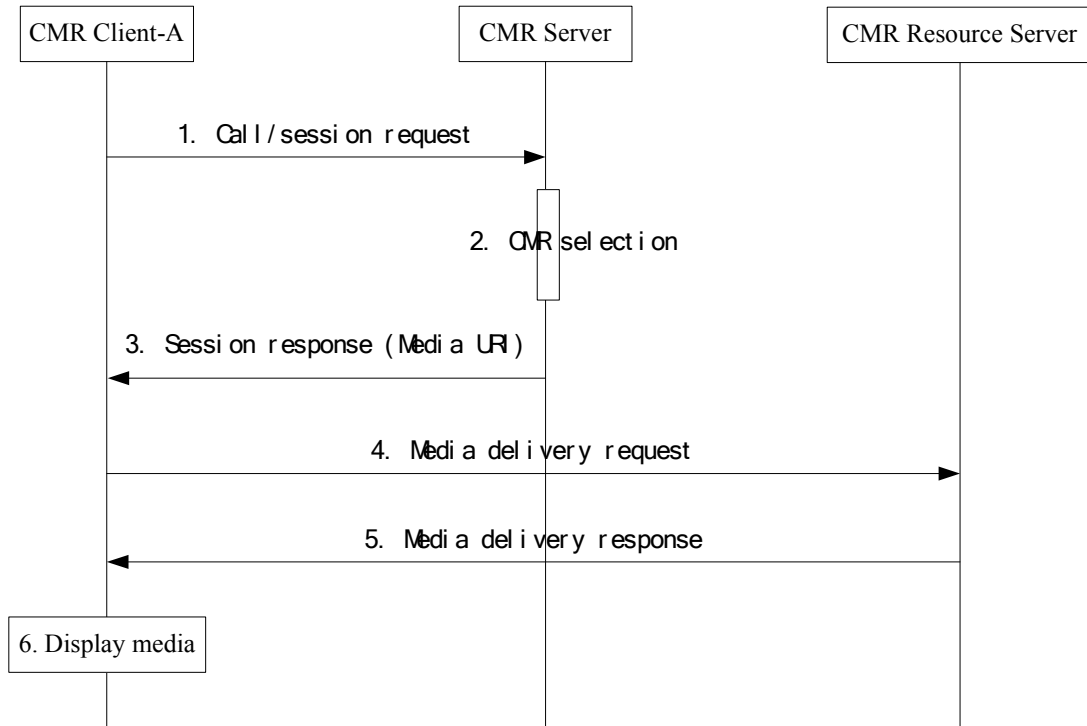
[Note:] Step 6 to step 10 are not required when the default CMR Resource may not be played by the CMR Resource Server.

11. The CMR Server sends the charging request to the Charging Enabler.
12. The Charging Enabler sends the charging response to the CMR Server.

[Note:] Step 12 and step 13 are optional. These steps are needed if SP requires charging for this activity.

### B.3 Download Playing Flow

This section provides the flow of playing CMR Resource using download method and takes the customized ring back tone flow as an example.

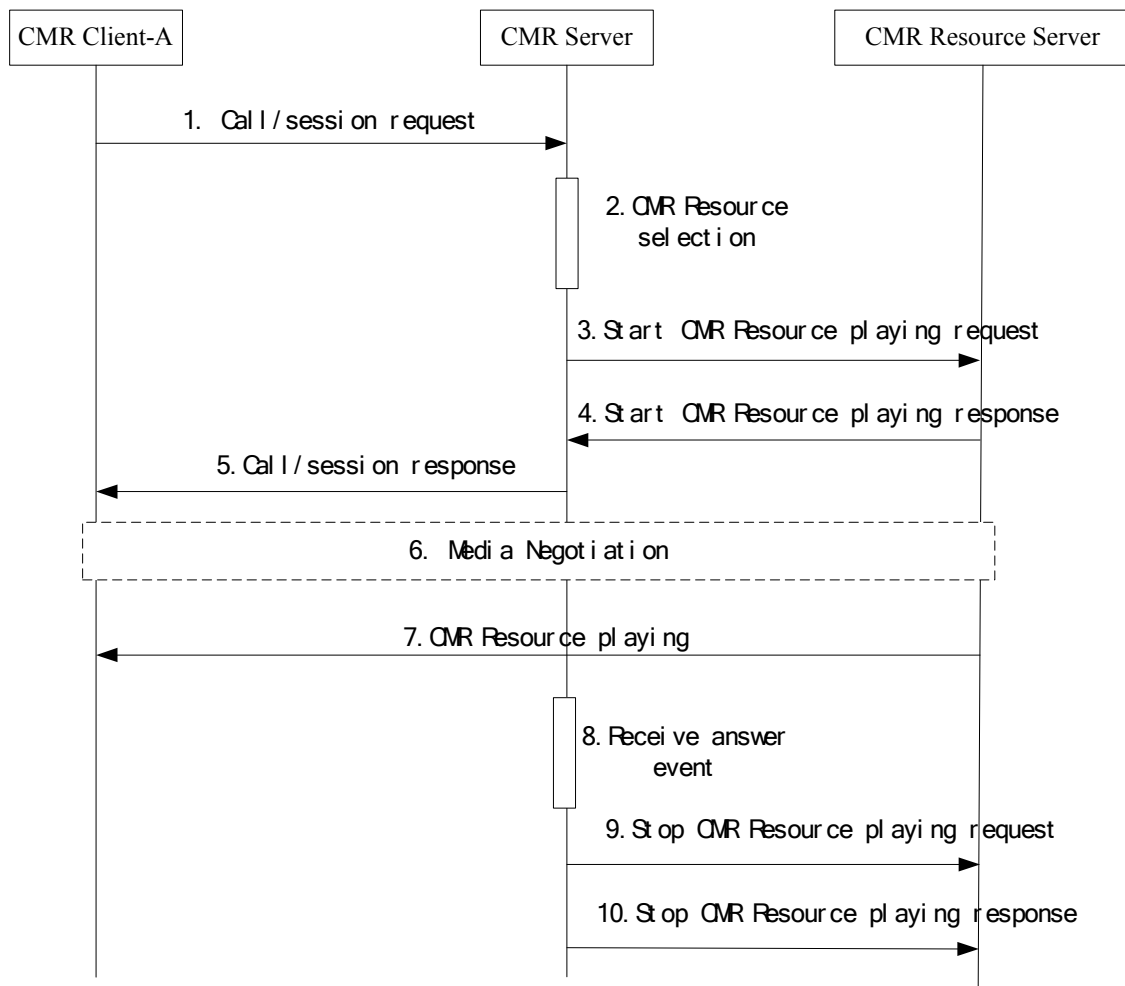


**Figure 4: Download playing flow**

1. CMR Client-A sends call/session request asking to play CMR Resource to CMR Client-A if the calling party or called party has subscribed the CMR service.
2. CMR Server selects appropriate CMR Resource.
3. CMR Server sends response including the URI of the selected CMR Resource to CMR Client-A.
4. CMR Client-A extracts media URI and sends media delivery request to CMR Resource Server for downloading the media.
5. CMR Resource Server sends the media to CMR Client-A.
6. CMR Client-A displays the received media.

## B.4 Server Playing Flow

This section provides the flow of playing audio or video type CMR Resource and takes the customized ring back tone flow as an example.



**Figure 5: Server playing flow**

1. CMR Client-A sends call/session request to CMR Server if the calling party or called party has subscribed the CMR service.
2. CMR Server selects appropriate CMR Resource to play.
3. CMR Server sends start CMR Resource playing request to CMR Resource Server.
4. CMR Resource Server sends response to CMR Server, optionally containing the CMR Resource media information.
5. CMR Server sends call/session response to CMR Client. It may contain media negotiation information when CMR is deployed in IMS network.
6. Media negotiation between CMR Client and CMR Resource Server.

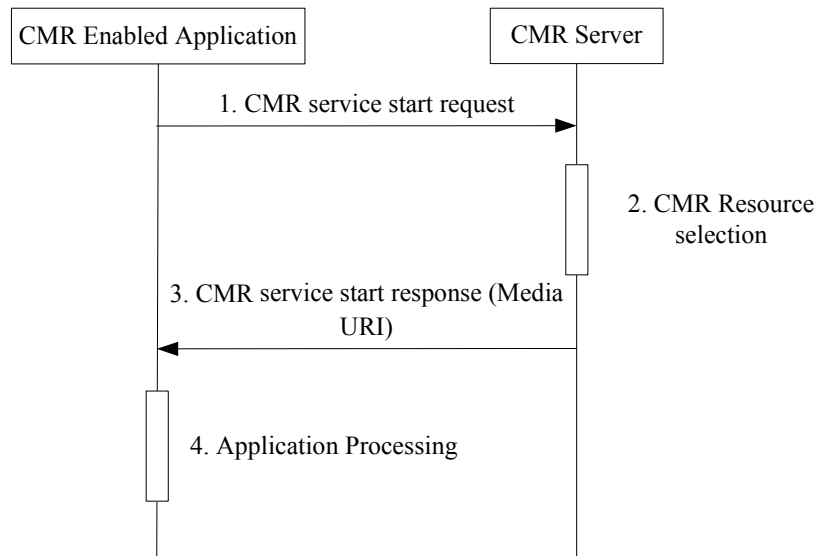
[Note]: This step is optional. It is needed when the CMR service is deployed in CS network and video CMR Resource would be played.

7. After successful media negotiation, CMR Resource Server plays the CMR Resource to CMR Client-A.

8. CMR Server receives the answer event.
9. CMR Server sends stop CMR Resource playing request to CMR Resource Server.
10. CMR Resource Server sends response to CMR Server.

## B.5 Download Playing Flow (CMR Enabled Application)

This section illustrates the interaction between CMR Enabled Application and CMR Server and provides the flow of playing CMR Resource using download method.

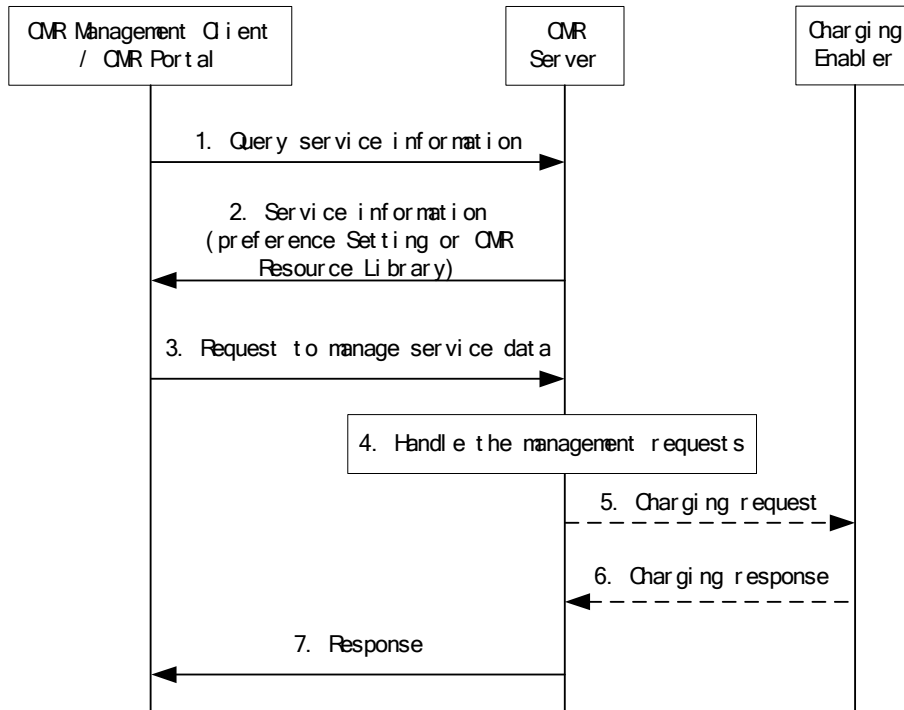


**Figure 6: Download playing flow (CMR Enabled Application)**

1. CMR Enabled Application sends CMR service start request to CMR Server.
2. CMR Server selects appropriate CMR Resource.
3. CMR Server sends CMR service start response including the URI of the selected CMR Resource to CMR Enabled Application.
4. CMR Enabled Application continues its processing: CMR Enabled Application sends the URI to CMR Client. And the following steps refer to step 4->6 in B.3.

## B.6 Flow of Service Management

This section provides the flow of service management as an example. CMR Subscriber could manage his/her Preference Settings and the Personal Resource Library via CMR Management Client or CMR Portal. SP could do the management actions via CMR Portal. The following flow illustrates the flow of subscribing CMR Resource as an example.

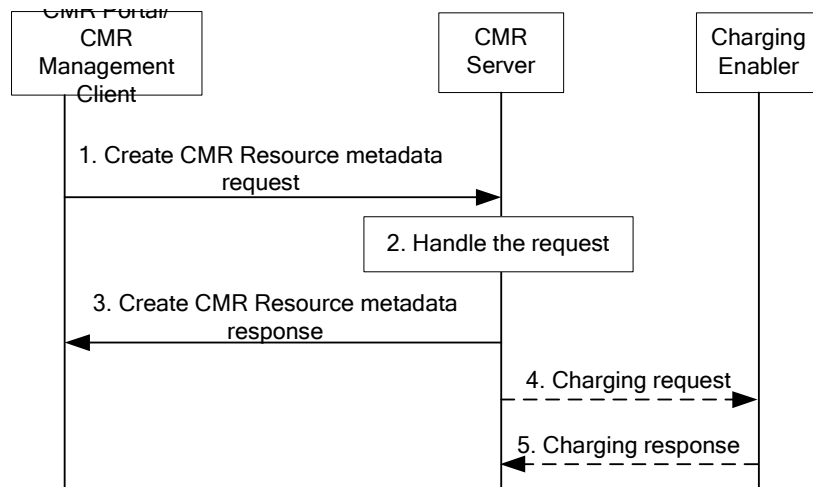


**Figure 8: Flow of service management**

1. CMR Management Client or CMR Portal sends the CMR Resource search request from CMR Server.
2. CMR Server sends the CMR Resource search response to CMR Management Client or CMR Portal.
3. CMR Subscriber wants to subscribe the CMR Resources from the search result, CMR Management Client or CMR Portal sends the subscribe CMR Resource request to CMR Server.
4. CMR Server handles the request.
5. CMR Server records the CMR Subscriber’s management activities and sends the subscribe CMR Resource response to CMR Management Client or CMR Portal.
6. CMR Server generates charging events for this management activity and sends the charging request to Charging Enabler.
7. Charging Enabler sends the charging response to CMR Server.

## B.7 Flow of CMR Resources Management

This section provides the flow of CMR Resources management as an example. SP/CP and CMR Subscriber could create/delete/modify CMR Resource Metadata via CMR Management Client or CMR Portal.



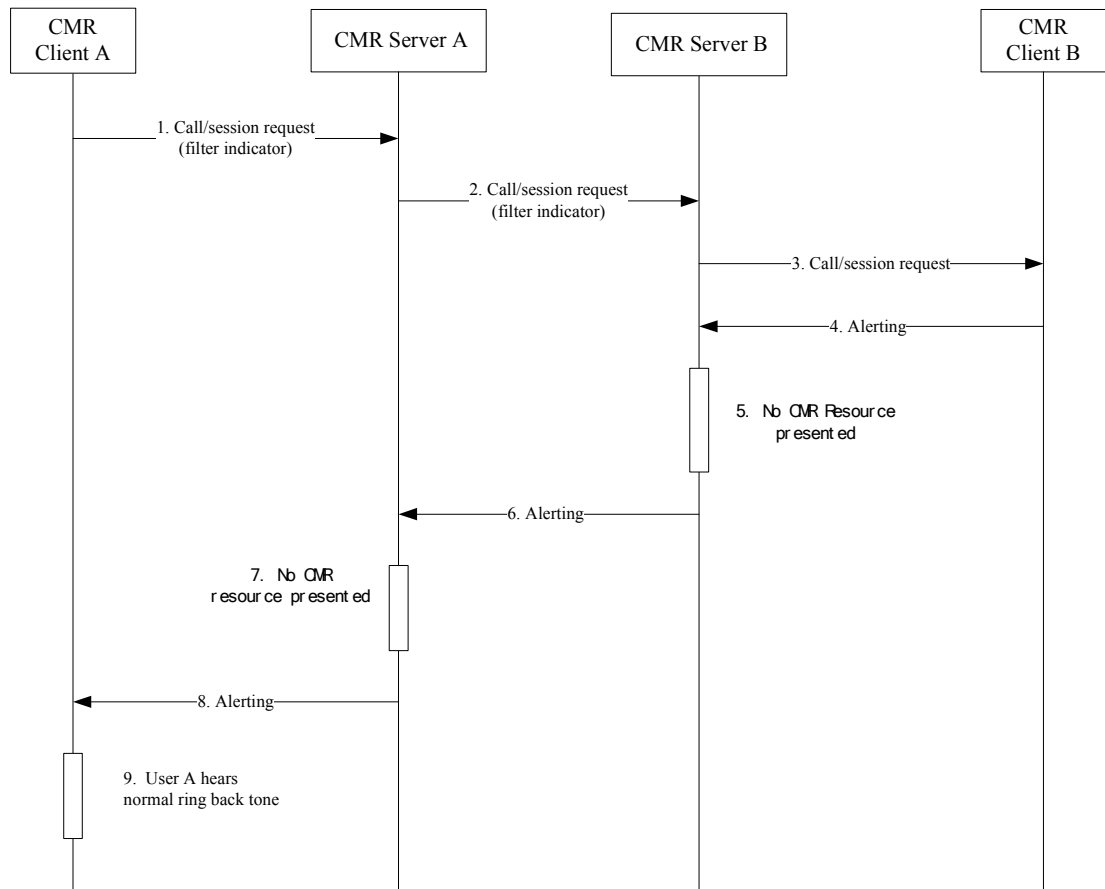
**Figure 9: Flow of CMR Resources management**

1. CMR Management Client or CMR Portal sends the create CMR Resource metadata request (i.e. for CMR Resource uploaded) to CMR Server.
2. CMR Server handles the requests.
3. CMR Server records the management activities and sends the management responses to CMR Management Client or CMR Portal.
4. CMR Server sends the charging request to Charging Enabler.
5. Charging Enabler sends the charging response to CMR Server.

[Note:] Step 4 and step 5 are optional. These steps are needed if SP requires charging the activities of managing CMR Resource Metadata.

## B.8 CMR Resource Filtering Flow

In this example, it assumes that the CMR End User A does not want to experience any CMR Resource when the call is initiated or by the pre-configured filtering setting on CMR Server.



**Figure 10: CMR Resource filtering flow**

1. CMR Client A sends a call/session request (with filter indicator when CMR End User A wants to filter CMR Resource for this call).
2. CMR Server A evaluates the filter received in the call request or the pre-configured filter setting of CMR End User A (who is a CMR Subscriber) on the CMR Sever A and sends the call request with the filter indicator.
3. CMR Server B records the filter indicator associated with this call and sends the call request without the filter indicator towards CMR Client B.
4. CMR Client B returns alerting message when CMR Client B is idle.
5. CMR Server B filters CMR Resource according to recorded filter indication.
6. CMR Server B forwards the alerting message.
7. CMR Server A filters CMR Resource according to recorded filter indication.
8. CMR Server A forwards the received alerting message.
9. CMR End User A hears normal ring back tone.



## Appendix C. CMR Enabler interaction with external Entities

### C.1 CMR Server interaction with Charging Enabler

The CMR Server interacts with the Charging Enabler over CH-1 and CH-2 interfaces for CMR related off-line and on-line charging respectively as defined in [OMA-Charging-AD].

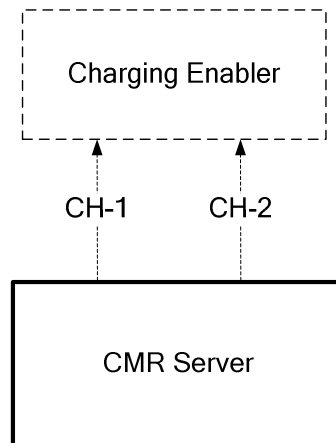


Figure 11: The interaction between CMR Server and Charging Enabler

### C.2 CMR Server interaction with Location Enabler

CMR Enabler needs to request and get location information from Location Enabler when CMR Enabler supports selecting or generating a CMR Resource based on the CMR Subscriber’s location information.

#### C.2.1 CMR Server interaction with MLS

The CMR Server acts as the MLS Client and interacts with the Requesting Location Server via the Le Reference Point as defined in [OMA-MLS-AD] for the purpose of obtaining location information for CMR Subscribers.

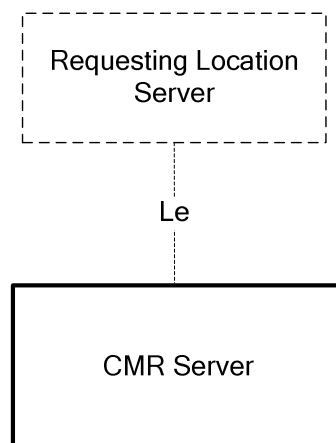


Figure 12: The interaction between CMR Server and Requesting Location Server

## C.2.2 CMR Server interaction with LOCSIP

When CMR Enabler supports selecting or generating a CMR Resource based on the CMR Subscriber’s location information and LOCSIP is available, CMR Enabler can request and get location information from LOCSIP Enabler.

Two interaction methods between CMR Server and LOCSIP Enabler are given: subscribing to location notification for a list of targets and subscribing to location notification for a single target. Two methods have different advantages:

Subscribing to location notification for a list of targets: flexible to subscribing to a list of CMR Subscribers and get location notifications as needed. When CMR Server wants to subscribe a new CMR Subscriber’s location information, it needs to maintain the list and doesn’t need to do subscription again.

Subscribing to location notification for a single target: flexible to subscribing to a CMR Subscriber’s location information and get notification as needed. When CMR Server wants to subscribe a new target’s location information, it needs to subscribe this new single target.

### C.2.2.1 Subscribing to Location for a List of Targets

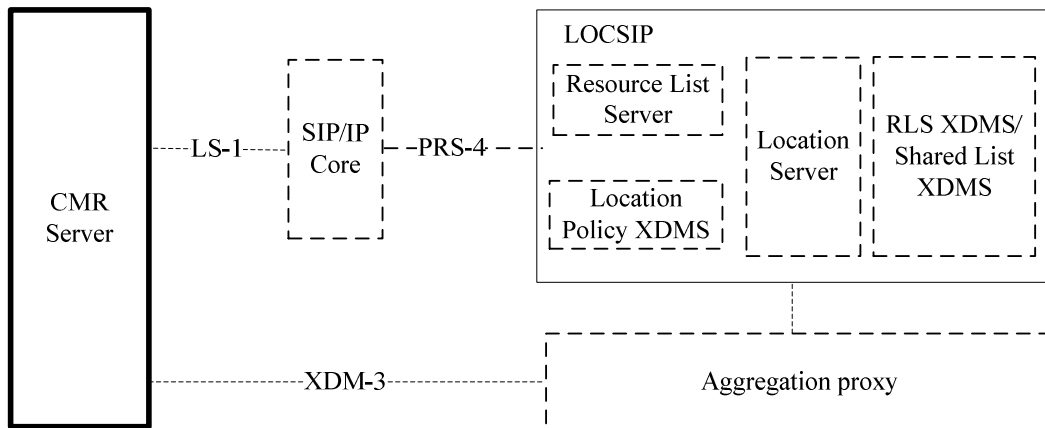


Figure 13: The interaction between CMR Server and LOCSIP Enabler (Subscribing to Location for a List of Targets)

The CMR Server acts as a Location Client to request/receive location information from the LOCSIP Enabler via the SIP/IP Core for the list of CMR Subscribers through LS-1 Reference Point.

The CMR Server interacts with LOCSIP Enabler via Aggregation Proxy for maintaining the list of CMR Subscribers whose location to be requested and management of the location policy document through XDM-3 Reference Point.

The Location Server and Location Policy XDMS are specified in the [OMA-LOCSIP].

The functionality of the Aggregation Proxy is described in [OMA-XDM-AD].

### C.2.2.2 Subscribing to Location Notification

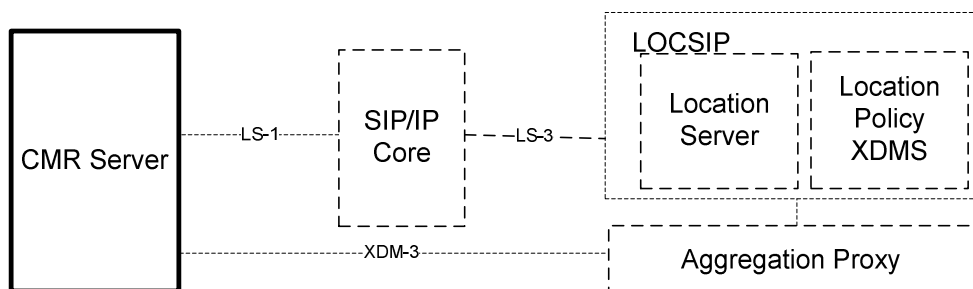


Figure 14: The interaction between CMR Server and LOCSIP Enabler (Subscribing to Location Notification)

The CMR Server acts as a Location Client to request/receive location information from the LOCSIP Enabler via the SIP/IP Core for a single CMR Subscriber through LS-1 and LS-3 Reference Point.

The CMR Server interacts with LOCSIP Enabler via Aggregation Proxy for management of the location policy document through XDM-3 Reference Point.

The CMR Server uses the methods defined by [OMA- LOCSIP] to acquire CMR Subscriber location information.

The Location Server and Location Policy XDMS are specified in the [OMA-LOCSIP].

## C.3 CMR Server interaction with Presence Enabler

CMR Enabler needs to request and get presence information from Presence Enabler when CMR Enabler supports selecting or generating a CMR Resource based on the CMR Subscriber presence information.

Two interaction methods between CMR Server and Presence Enabler are given: subscribing to a Presence List and subscribing to a single presentity. Two methods have different advantages:

Subscribing to a presence list: flexible to subscribing to a list of CMR Subscribers' presence information and get notifications. When CMR Server wants to subscribe a new CMR Subscriber's presence information, it needs to maintain the list and doesn't need to do subscription again.

Subscribing to a single presentity: flexible to subscribing to a single CMR Subscriber's presence information and get notification as needed. When CMR Server wants to subscribe a new CMR Subscriber's presence information, it needs to subscribe this new presentity.

### C.3.1 Subscribe to a Presence List

The CMR Server acts as a Watcher to use subscribe and notify method to get the presence status of a list of CMR Subscribers residing in SIP/IP Core. CMR Server interacts with the Resource List Server through PRS-2 and PRS-4 Reference Points.

The CMR Server acts as an XDMS to maintain the list of CMR Subscribers in the RLS XDMS via Aggregation Proxy through Reference Point XDM-3.

The functionality of the Aggregation Proxy is described in [OMA-XDM-AD].

The Watcher, RLS XDMS and Resource List Server are specified in [OMA-PRS-AD].

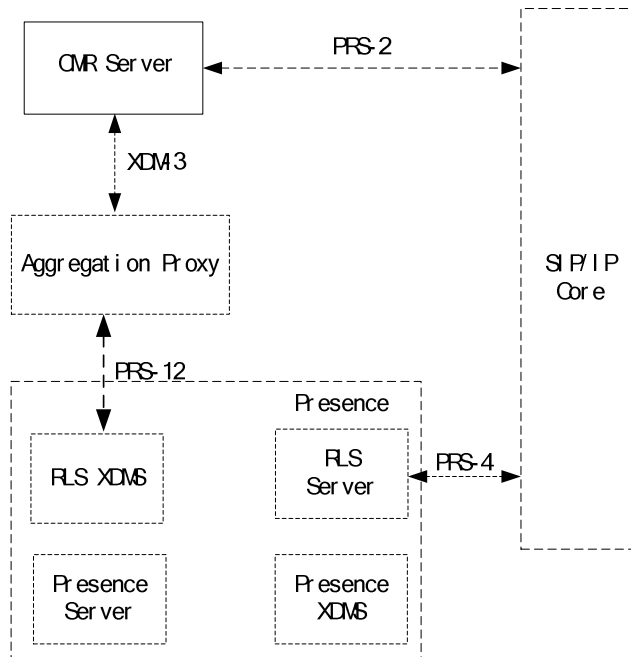


Figure 15: The interaction between CMR Server and Presence Enabler (Subscribe to a presence list)

### C.3.2 Subscribe to a single presentity

The CMR Server acts as a Watcher to use subscribe and notify method to get the presence status of a single CMR Subscriber from the Presence Server through PRS-2 and PRS-3 Reference Points.

The Watcher, Presence Server are specified in [OMA-PRS-AD].

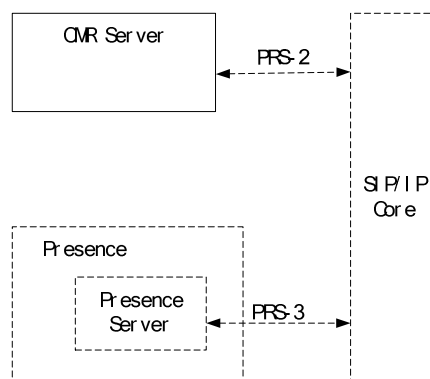


Figure 16: The interaction between CMR Server and Presence Enabler (Subscribe to a single presentity)