



# Rich Communication Suite 5.2 Endorsement of OMA CPM 2.0 Message Storage

Version 4.0

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*This is a Non-binding Permanent Reference Document of the GSMA*

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# 1 Introduction

## 1.1 Overview

This document describes which sections of the OMA CPM 2.0 Message Storage specification (see [CPMMSGSTORE]) are supported by RCS (Rich Communication Suite) 5.2.

For details on how this fits technically in this in the RCS scope see [RCS5.2].

For easier reference, this document follows the same structure as [CPMMSGSTORE]. For that reason the headings of the sections are citations of the headings used in [CPMMSGSTORE], within the sections they describe what part the equivalent section in [CPMMSGSTORE] is supported by RCS. For sections that are not applicable in their entirety, this is mentioned at the top level of the section and the subsections are not mentioned explicitly thereafter. For sections in which no difference with [CPMMSGSTORE] is introduced however, also the subsections are mentioned to state explicitly that they are applicable as well.

This specification lists differences and clarifications for RCS compared to [CPMMSGSTORE]. The former category includes both differences in expected behaviour compared to [CPMMSGSTORE] as well as corrections in behaviour, which should appear over time when bug fixes are applied to [CPMMSGSTORE]. The latter category describes what options are chosen for RCS in case [CPMMSGSTORE] provides multiple possibilities and provides clarifications on how the provided functionality is expected to be used.

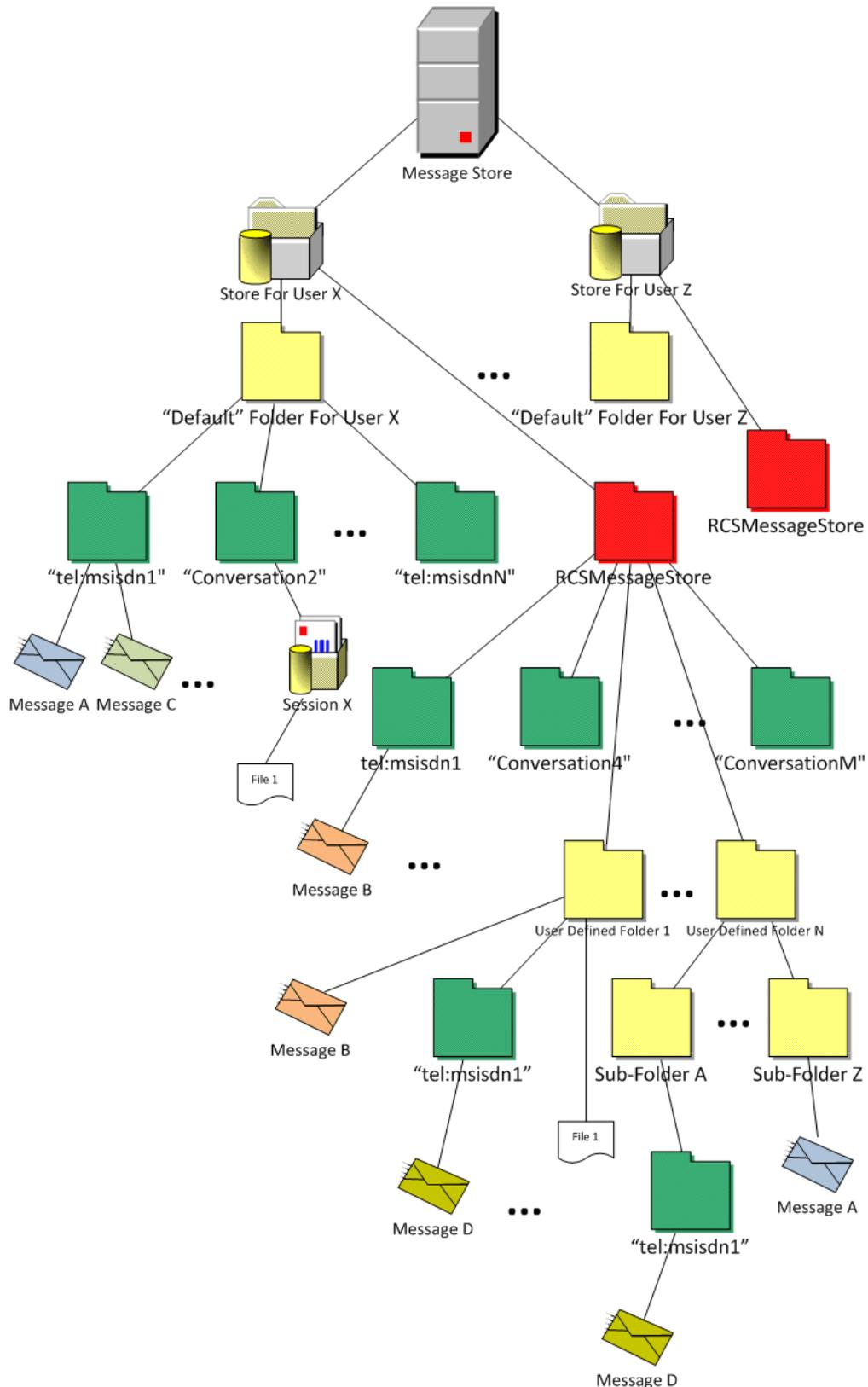
In RCS, the message store will be used for two purposes:

- Long term, permanent storage/backup of messages the user wishes to store
- Temporary storage for sent/received messages in order to allow synchronization with devices that respectively didn't participate in the sending or were offline when the message was received

The latter messages will be stored by the participating function in conversations in the "default" system folder of the Message Store. Messages stored in conversations in that root folder will be removed from the storage by the server when they reach their expiry time. Message objects and folders in the "default" system folder can be preserved from scheduled expiry by copying or moving them to the "RCSMessageStore" folder. Objects and folders are synchronized across all devices which have sessions towards the RCS user's message storage server, and notifications of activity can be aggregated to reduce network load. Object and folder deletion follows the conventional IMAP two-step deletion process: first flagged for deletion, then expunged at a later time or by separate action.

Permanently stored messages (that is the user's message store) will be stored in conversations in a folder called "RCSMessageStore" or sub-folders thereof. "RCSMessageStore" will be a folder stored directly in the user's store i.e. a peer of the "default" system folder.

This leads to a Message Store structure as shown in the example in Figure 1:



**Figure 1: Message Store Example**

As shown in the figure above, the store for the user contains the “default” system folder that contains only Conversation History folders. The “RCSMessageStore” folder located at the same level as the “default” system folder can contain Conversation History folders and other

folders. A folder hierarchy to organize the messages and session histories is thus only possible starting from the “RCSMessageStore” folder. The messages and session histories themselves are always stored in conversation history folders that correspond to the conversation in which the message or session history was sent. The same message or session history can occur multiple times in conversation history folders in different subfolders of the “RCSMessageStore” folder. For messages or session histories stored in a conversation history that is directly in the “default” system folder, a copy will not exist in the RCS Message Store folder or its subfolders

From a user perspective the only difference between an object or subfolder in a conversation history in the “default” system folder and a similar object or subfolder in a conversation history in the “RCSMessageStore” folder is that he (or his client) has selected the latter object or subfolder for permanent storage. An RCS client will therefore present those messages and session histories as if they were in the same location. That is in the example Message B will always be presented in the same conversational view as Message A and Message C.

A user may only create their folders under “RCSMessageStore” to better manage their stored information. A user defined folder is similar to a folder created for a file management system and the user can manipulate the contents in it freely; such as:

- store a standalone media object in it
- copy any objects from other folders into it
- remove any objects in it and move any objects in it to other user defined folders

## 1.2 Scope

This document provides the details of the storage interfaces used for the messaging technology in RCS.

## 1.3 Definition of Terms

Term	Description
ACL	Access Control List
CPIM	Common Presence and Instant Messaging
CPM	Converged IP Messaging
IMAP	Internet Message Access Protocol
MIME	Multipurpose Internet Mail Extensions
OMA	Open Mobile Alliance
PSK	Pre Shared Key
RCS	Rich Communication Suite
RTP	Real Time Protocol
SASL	Simple Authentication and Security Layer
TLS	Transport Layer Security
UID	Unique (Message) Identifier
URL	Uniform Resource Locator

## 1.4 Document Cross-References

Ref	Document Number	Title
1	[RCS5.2]	GSMA PRD RCC.07 RCS5.2 - Advanced Communications: Services and Client Specification, Version 5.0, 07 May 2014 <a href="http://www.gsma.com/rcs/">http://www.gsma.com/rcs/</a>
2	[CPMMSGSTORE]	CPM Message Storage, Open Mobile Alliance Ltd. OMA-TS-CPM_MessageStorage-V2_0-20130723-D <a href="http://member.openmobilealliance.org/ftp/public_documents/COM/COM-CPM/Permanent_documents/OMA-TS-CPM_MessageStorage-V2_0-20130723-D.zip">http://member.openmobilealliance.org/ftp/public_documents/COM/COM-CPM/Permanent_documents/OMA-TS-CPM_MessageStorage-V2_0-20130723-D.zip</a>
3	[RCS5-CONVENDORS]	GSMA PRD RCC.11 - Rich Communication Suite 5.2 Endorsement of OMA CPM 2.0 Conversation Functions, Version 3.0, 07 May 2014 <a href="http://www.gsma.com/rcs/">http://www.gsma.com/rcs/</a>
4	[RFC4315]	"Internet Message Access Protocol (IMAP) – UIDPLUS extension", M. Crispin, Dec 2005 <a href="http://www.ietf.org/rfc/rfc4315.txt">http://www.ietf.org/rfc/rfc4315.txt</a>
5	[RFC5819]	"IMAP4 Extension for Returning STATUS Information in Extended LIST", A. Melnikov et al, March 2010 <a href="http://www.ietf.org/rfc/rfc5819.txt">http://www.ietf.org/rfc/rfc5819.txt</a>

## 2 References

See chapter 1.4.

## 3 Terminology and Conventions

The same conventions, terminology, definitions and abbreviations used in chapter 3 of [CPMMSGSTORE] are valid for RCS. Additional abbreviations and terms specific for this document can be found in chapter 1.3.

## 4 Introduction

Note: RCS supports the following in the area of message storage

- Storage of Standalone CPM Messages
- Storage of CPM Session Histories including Session Info and Group State Objects
- Storage of File Transfer Histories
- Storage of those as CPM Conversation Histories
- Storage of Media objects attached to CPM Messages
- Storage of Stand-alone Media Objects
- Management of the storage folders and objects
- Synchronization with the device's local message store
- Search of storage folders and objects by keywords

RCS does not support the following in the area of message storage:

- Authorization of other users to access the message store

#### 4.1 CPM Version 1.0

Following differences with [CPMMSGSTORE]:

- In the Operations, the management of access rights on stored objects is not applicable for RCS

#### 4.2 CPM Version 2.0

No differences with [CPMMSGSTORE].

### 5 Common Procedures

#### 5.1 Authorization and Authentication

No differences with [CPMMSGSTORE].

##### 5.1.1 Authentication

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- TLS/PSK-TLS (transport layer security / pre-shared key-transport layer security) will be used for RCS

##### 5.1.2 Authorization

Following differences with [CPMMSGSTORE]:

- The extension with the possibility to define access control lists including the reference to the IMAPv4 (Internet Message Access Protocol) ACL (Access Control List) Extension is not applicable for RCS

As a clarification for RCS:

- The use of IMAP4 URLAUTH is limited to only the home domain

#### 5.2 Storage Folder and Objects

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- In RCS, the “default” system folder shall only contain Conversation History Folders (see section 5.2.4)
- In the user’s store, the RCS client shall store messages in a user folder named “/RCSMessageStore” folder which the user cannot remove. This folder could contain Conversation History Folders moved/copied directly from the “default” system folder as well as other user defined folders.
- An RCS Message Store Client (e.g. RCS Client or Participating Function) shall ignore unknown storage objects
- An RCS Message Store Client (e.g. RCS Client or Participating Function), for all objects of this section, shall store MIME headers as described in section 6.3.1 of this document.
- An RCS Client shall store objects in the RCSMessageStore folder and shall not store objects in the “default” system folder.

### 5.2.1 Message Object

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- Message Objects will always be stored in their corresponding Conversation History and Session History Folders (see sections 5.2.2 and 5.2.4). They can also be copied into user defined folders

### 5.2.2 Session History Folder

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- To preserve the integrity of a chat session, Objects stored in a Session History folder should not be moved independently to another Conversation History or Session History folder. An Object stored in a Session History folder can be copied to a user defined folder, in this case it might lose its association with the original chat history.

### 5.2.3 File Transfer History Object

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- File Transfer History Objects will always be stored in their corresponding Conversation History or Session History folders (see sections 5.2.2 and 5.2.4)

#### 5.2.3.1 Application/X-CPM-File-Transfer Content Type Definition

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- As in each session only one file is transferred only one file-object element will be provided

### 5.2.4 Conversation History Folder

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- To preserve the integrity of a conversation history, Objects stored in a Conversation History folder shall not be moved to another place, instead the whole folder should be moved together. An Object stored in a Conversation History folder can be copied to a user defined folder, in this case it might lose its association with the original conversation history.

### 5.2.5 Stand-alone Media Object

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- The standalone media object can only be stored in a user defined folder.

### 5.2.6 User Folder

No differences with [CPMMSGSTORE].

### 5.2.7 Session Info Object

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- Refer to section 6.3.5

### 5.2.8 Group State Object

No differences with [CPMMSGSTORE].

## 5.3 Identification of Storage Objects

No differences with [CPMMSGSTORE].

## 5.4 Notifications

No differences with [CPMMSGSTORE].

## 5.5 Metadata Structure

Following differences with [CPMMSGSTORE]:

- For RCS, the \read-report-sent and \$MDNSent are not applicable because the actual IMDN will be stored

# 6 Procedures at Message Storage Client

Following difference with [CPMMSGSTORE]:

- The “ACL” IMAP4 extension defined in RFC 4314 is not applicable for RCS
- The “CONDSTORE” IMAP4 extension defined in RFC 4551 is not applicable for RCS
- The “QRESYNC” IMAP4 extension defined in RFC 5162 is not applicable for RCS
- RCS requires support of the “UIDPLUS” IMAP4 extension defined in [RFC4315]
- RCS requires support of the “LIST-STATUS” IMAP4 extension defined in [RFC5819]

## 6.1 General Operations

### 6.1.1 Authenticate Operation

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- If the user’s message store folder does not contain an “RCSMessageStore” folder at the same level as the “default” system folder when the client logs in for the first time, the client will create such a folder.

### 6.1.2 Set Active Folder Operation

No differences with [CPMMSGSTORE].

## 6.2 Access Control List Operations

Not applicable for RCS

## 6.3 Message and History Operations

### 6.3.1 Object Store Operation

Following differences with [CPMMSGSTORE]:

- Unless requested by the user to store them in a specific folder as part of a move or copy operation, for RCS objects relating to a 1-to-1 conversation (i.e. file transfer objects, session info objects, message objects related to standalone messages, 1-to-1 chat messages, and legacy messages (i.e. SMS/MMS)) shall not be stored in a folder identified by the Conversation-ID, but rather shall be stored in a folder identified by the identity of the Contact in the Conversation. This identity shall be determined based on the Authenticated Originator's Address that is part of the signalling. If an MSISDN based address is available, that shall be used after conversion to a tel URI if only available as a SIP URI with a user=phone parameter. When an alphanumeric URI is used it shall be converted to lower case first. URI parameters shall not be included in the folder name.
- The CPM Participating Function shall thus use this default storage location when automatically recording 1-to-1 conversations and their associated disposition notifications.
- When automatically storing disposition notifications pertaining to a CPM Group Session that were transported using a SIP MESSAGE, these notifications shall be stored in a session folder with Conversation-ID and Contribution-ID equal to the Conversation-ID carried in the SIP MESSAGE request.

As a clarification for RCS

- An RCS Message Store Client using the Object Store operation will provide an initial set of metadata flags
- The Participating Function shall always store the following MIME headers for every object:
  - The To header shall be set to the asserted TEL URI from the P-Asserted-Identity header field from the corresponding SIP INVITE request/response, if available, or to the value in the SIP INVITE Request-URI if the session is not yet set up.
  - The From header shall be set to the asserted TEL URI from the P-Asserted-Identity header field from the corresponding SIP INVITE request/response and include the device identifier as described in section 3.4.4.1.8 of [RCS5.2].
  - The Conversation-ID header set to the Conversation-ID of the session or message, if any
  - The Contribution-ID header set to the Contribution-ID of the session or message, if any
  - The IMDN-Message-ID header set to the IMDN Message-ID of the message, if any.
  - The P-Asserted-Service header set to the P-Asserted-Service value of the message if present, otherwise set based on the service identifier in the Accept-Contact header.

### 6.3.2 Object Fetch Operation

No differences with [CPMMSGSTORE].

### 6.3.3 Object Preview Fetch Operation

No differences with [CPMMSGSTORE].

### 6.3.4 Object Copy Operation

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- Objects in a Conversation History Folder can only be copied to a user defined folder.
- Objects in a Session History Folder can only be copied to a user defined folder.
- All associated IMDNs shall also be copied along with the message object or file transfer history object.
- The associated session info object shall also be copied with the message object if not already present in the user defined folder.

### 6.3.5 Object Remove Operation

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- The latest Group State Object shall not be removed from the Session History Folder. The latest Group State Object can only be removed together with the removal of the entire Session History Folder.
- The RCS user shall be able to preserve objects that are scheduled for deletion by copying, or moving, them to the "RCSMessageStore" folder.
- All associated IMDNs shall also be deleted along with the message object or file transfer history object.
- The associated session info object shall be deleted when the last message object related to that session is deleted.

## 6.4 Folder Operations

### 6.4.1 Folder Create Operation

No differences with [CPMMSGSTORE].

### 6.4.2 List Folder Operation

No differences with [CPMMSGSTORE].

### 6.4.3 Folder Move Operation

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- An RCS client can move Conversation History folders in the "default" system folder to the "RCSMessageStore" folder.
- An RCS client shall not move nor remove the "RCSMessageStore" folder

#### **6.4.4 Folder Remove Operation**

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- If the folder being removed contains further objects:
  - The RCS client shall generate individual remove requests for each object in the folder being removed
  - The RCS client shall flag the folder being removed as “Deleted” in the same way that messages are marked for deletion, such that when the message storage server expunges objects marked for deletion, this folder will also be removed. This allows folders to be recovered before expunging, in the same way that messages can be recovered.

#### **6.4.5 Folder Search Operation**

No differences with [CPMMSGSTORE].

### **6.5 Reference Operations**

No differences with [CPMMSGSTORE].

## **6.6 Metadata Management Operations**

### **6.6.1 Metadata Update Operation**

No differences with [CPMMSGSTORE].

### **6.6.2 Metadata Fetch Operation**

No differences with [CPMMSGSTORE].

## **6.7 Synchronization**

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- An RCS client will present Message Objects in a Conversation History Folder or a Session History Folder in the “default” system folder of the Message Store in the same (conversational) views as newly received messages albeit with the proper status
- An RCS client will present Message Objects in a Conversation History Folder or a Session History Folder in the “RCSMessageStore” folder in the same (conversational) views as newly received messages albeit with the proper status
- If an RCS client finds that an object in a Conversation History Folder in the “default” system folder of the Message Store has been marked for deletion and the expiration time for that object is in the past, the client will not remove the object from its local storage but shall not present the object in any conversational view.
- An RCS client will provide an option to preserve messages from being deleted at expiry, by copying the message to the “RCSMessageStore”, preserving the same (conversational) hierarchy as the message had in the “default” system folder.

## 6.8 Notification Operations

No differences with [CPMMSGSTORE].

## 7 Procedures at Message Storage Server

Following difference with [CPMMSGSTORE]:

- The “ACL” IMAP4 extension defined in RFC 4314 is not applicable for RCS
- The “CONDSTORE” IMAP4 extension defined in RFC 4551 is not applicable for RCS
- The “QRESYNC” IMAP4 extension defined in RFC 5162 is not applicable for RCS
- RCS requires support of the “UIDPLUS” IMAP4 extension defined in [RFC4315]
- RCS requires support of the “LIST-STATUS” IMAP4 extension defined in [RFC5819]

### 7.1 General Operations

#### 7.1.1 Authenticate Operation

No differences with [CPMMSGSTORE].

#### 7.1.2 Set Active Folder Operation

No differences with [CPMMSGSTORE].

### 7.2 Access Control List Operations

Not applicable for RCS

### 7.3 Objects Operations

#### 7.3.1 Object Store Operation

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- The client’s responsibility to keep proper conversation histories is not enforced by the server

##### 7.3.1.1 Handling Deferred CPM Message Objects

Not applicable for RCS

#### 7.3.2 Object Fetch Operation

No differences with [CPMMSGSTORE].

#### 7.3.3 Object Preview Fetch Operation

No differences with [CPMMSGSTORE].

#### 7.3.4 Object Copy Operation

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- The client's responsibility to keep proper conversation histories is not enforced by the server
- The Message Storage Server shall preserve the integrity of a conversation or chat history in the Conversation History and Session History Folders.

### **7.3.5 Object Remove Operation**

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- The latest Group State Object shall not be removed from the Session History Folder. The latest Group State Object can only be removed together with the removal of the entire Session History Folder.
- The message storage server shall remove Session History folders which no longer contain any chat message objects, according to service provider policy.
- The message storage server will remove objects from Conversation History folders in the "default" system folder of the Message Store that have expired according to a service provider's policy
- The message storage server will remove Conversation History folders that contain no Message, File Transfer History or Session History folders any longer from the "default" system folder of the Message Store
- The message storage server shall support object removal using the conventional IMAP two-step deletion process:
  - objects which the user deletes, or which have reached their expiry time, shall be first marked for deletion,
  - and are then expunged from the message storage server at a subsequent fixed interval in time.
- The expunging of objects marked for deletion may be based on explicit RCS user request or by service provider policy. The client's responsibility to keep proper conversation histories is not enforced by the server.

## **7.4 Metadata Management Operation**

### **7.4.1 Metadata Update Operation**

No differences with [CPMMSGSTORE].

### **7.4.2 Metadata Fetch Operation**

No differences with [CPMMSGSTORE].

## **7.5 Folder Operations**

### **7.5.1 Folder Create Operation**

No differences with [CPMMSGSTORE].

### **7.5.2 List Folders Operation**

No differences with [CPMMSGSTORE].

### 7.5.3 Folder Move Operation

No differences with [CPMMSGSTORE].

### 7.5.4 Folder Remove Operation

No differences with [CPMMSGSTORE].

### 7.5.5 Folder Search Operation

No differences with [CPMMSGSTORE].

## 7.6 Reference Operations

No differences with [CPMMSGSTORE].

## 7.7 Message and History Synchronization Operations

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- the message storage server may, subject to service provider policy, aggregate notifications of activity such that only a single notification results at the end of a series of operations.

## 7.8 Notifications Operations

No differences with [CPMMSGSTORE].

## Appendix A. Change History

Appendix not relevant for RCS: as with the other RCS documents the history table is at the end of the document.

## Appendix B. Static Conformance Requirements

Appendix not relevant for RCS

## Appendix C. CPM-Defined IMAP Flag Extensions

Following differences with [CPMMSGSTORE]:

NOTE: The Conversation-ID, Contribution-ID, IMDN-Message-ID and P-Asserted-Service MIME headers need to be defined in [CPMMSGSTORE]. Until this is the case, they are defined here.

- The Conversation-ID MIME header is defined. The limits for the occurrence of the field are defined in the following table:

Field	Min Number	Max Number
conversation-id	0	1

**Table 1: Conversation-ID Header**

The field itself is defined in ABNF as follows:

```
Conversation-ID = "Conversation-ID:" Token
```

- The Contribution-ID MIME header is defined. The limits for the occurrence of the field are defined in the following table:

Field	Min Number	Max Number
contribution-id	0	1

**Table 2: Contribution-ID Header**

The field itself is defined in ABNF as follows:

Contribution-ID = "Contribution-ID:" Token

- The IMDN-Message-ID MIME header is defined. The limits for the occurrence of the field are defined in the following table:

Field	Min Number	Max Number
contribution-id	0	1

**Table 3: IMDN-Message-ID Header**

The field itself is defined in ABNF as follows:

IMDN-Message-ID = "IMDN-Message-ID:" Token

- The P-Asserted-Service MIME header is defined. The limits for the occurrence of the field are defined in the following table:

Field	Min Number	Max Number
contribution-id	0	1

**Table 4: P-Asserted-Service Header**

The field itself is defined in ABNF as follows:

P-Asserted-Service = "P-Asserted-Service:" Token

## C.1. \READ-REPORT-SENT

Not applicable for RCS.

## Appendix D. Example of Session History Object

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- An RCS Message Store Client will always store MIME headers as described in section 6.3.1 of this specification.

## Appendix E. Example of File Transfer History Object

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- An RCS Message Store Client will always store MIME headers as described in section 6.3.1 of this specification.

## **Appendix F. STORAGE OF CPM SESSION**

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- An RCS Message Store Client will always store MIME headers as described in section 6.3.1 of this specification.

## **Appendix G. GROUP STATE OBJECT SCHEMA**

No differences with [CPMMSGSTORE].

## **Appendix H. CPM METADATA ANNOTATIONS (NORMATIVE)**

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- the “default” system folder DefaultFolderLocation is actually called “/Default”

## **Appendix I. REPRESENTATION OF CPM CONVERSATIONS IN THE CPM MESSAGE STORAGE (INFORMATIVE)**

No differences with [CPMMSGSTORE].

## Document Management

### Document History

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
1.0	13 Aug 2012	First version of the document based on Rich Communication Suite 5.0 Endorsement of OMA CPM 1.0 Message Storage Version 1.0 Approved by DAG and PSMC	PSMC	Tom Van Pelt / GSMA
1.0	26 Sep 2012	Added RCC.09 Number		Tom Van Pelt / GSMA
1.0	17 Sep 2013	Applied new document template		Tom Van Pelt / GSMA
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3.0	28 November 2013	Applied MCR1002 approved by DQR and Global Specification Group (GSG)	GSG	Tom Van Pelt / GSMA
4.0	07 May 2014	First version of the document for RCS 5.2: Include approved CR1003	GSG	Tom Van Pelt / GSMA

### Other Information

Type	Description
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