Rich Communication Suite 6.0 Endorsement of OMA CPM 2.1 Message Store

Version 6.0

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1 Introduction

1.1 Overview

This document describes which sections of the OMA CPM 2.1 Message Storage specification (see [CPMMSGSTORE]) are supported by RCS (Rich Communication Suite) 6.0.

For details on how this fits technically in this in the RCS scope see [RCS6.0].

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 the following 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
- Storage of voicemail related data (see section 5.2.9 for details)

The messages in the first two bullets above will be stored by the Participating Function in conversations in the Default 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in that root folder will be removed from the storage by the server when they reach their expiry time, unless they have been archived. Message objects and folders in the Default folder can be preserved from scheduled expiry by setting the Archived flag on them. 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.

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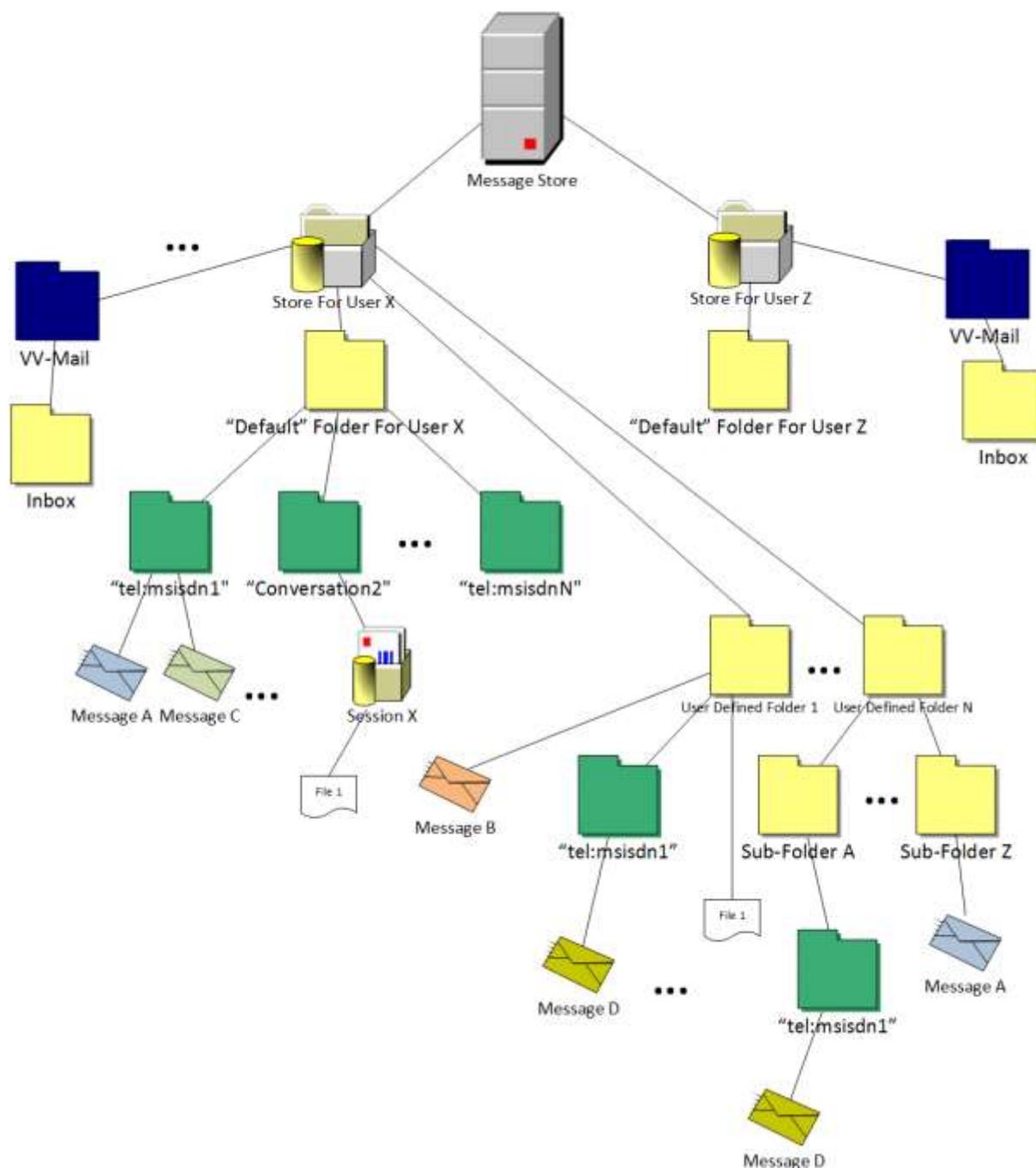
Figure 1: Message Store Example

As shown in the figure above, the store for the user contains the Default folder that contains only Conversation History folders. 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.

In addition, Voicemail related data is stored by the voicemail server as specified in section 5.2.9.

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 (e.g. a voicemail message)
- 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
VMS	VoiceMail Server

1.4   Document Cross-References

Ref	Document Number	Title
1	[RCS6.0]	GSMA PRD RCC.07 Rich Communication Suite 6.0 - Advanced Communications: Services and Client Specification, Version 7.0, 21 March 2016 http://www.gsma.com/rcs/
2	[CPMMSGSTORE]	CPM Message Storage, Open Mobile Alliance Ltd. OMA-TS-CPM_MessageStore-V2_1-20160209-C http://member.openmobilealliance.org/ftp/Public_documents/COM/COM-CPM/Permanent_documents/OMA-TS-CPM_Message_Store-V2_1-20160209-C.zip
3	[RCS-CONVENDORS]	GSMA PRD RCC.11 - Rich Communication Suite 6.0 Endorsement of OMA CPM 2.0 Conversation Functions, Version 5.0, 21 March 2016 http://www.gsma.com/rcs/
4	[RFC3261]	SIP (Session Initiation Protocol) IETF RFC http://tools.ietf.org/html/rfc3261

5	[RFC3458]	Message Context for Internet Mail IETF RFC http://tools.ietf.org/html/rfc3458
6	[RFC3501]	INTERNET MESSAGE ACCESS PROTOCOL - VERSION 4rev1 IETF RFC http://tools.ietf.org/html/rfc3501
7	[RFC3862]	Common Presence and Instant Messaging (CPIM): Message Format IETF RFC http://tools.ietf.org/html/rfc3862
8	[RFC3966]	The tel URI for Telephone Numbers IETF RFC http://tools.ietf.org/html/rfc3966
9	[RFC4122]	A Universally Unique IDentifier (UUID) URN Namespace IETF RFC http://tools.ietf.org/html/rfc4122
10	[RFC5819]	IMAP4 Extension for Returning STATUS Information in Extended LIST IETF RTFC http://www.ietf.org/rfc/rfc5819.txt
11	[RFC6068]	The 'mailto' URI Scheme IETF RFC http://tools.ietf.org/html/rfc6068
12	[VVM]	"Visual Voice Mail Interface Specifications", Version 1.3, Open Mobile Terminal Platform, OMTP http://www.gsma.com/newsroom/gsmadocuments/
13	[OMA-EVVM]	Enhanced Visual Voice Mail Architecture and technical Specification Version 1.0 07 August 2012. http://openmobilealliance.org

2   References

See chapter 1.4 above.

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

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].

4.3   CPM Version 2.1

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:

- All RCS top folders shall be registered in the OMNA registry at http://technical.openmobilealliance.org/Technical/technical-information/omna/oma-cpm-folder-directory.
- In RCS, the Default folder shall only contain Conversation History Folders (see section 5.2.6)
- In the user's store, the Conversation History Folders can be copied directly from the Default folder to a user defined folder.
- 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 may store objects in the Default folder.

5.2.1   Message Object

Following differences with [CPMMSGSTORE]:

- Instead of setting the MIME From to the address of the initiator of the CPM request or legacy message retrieved from the authenticated originator's CPM Address in the SIP request, or setting it to the value of the Referred-By header field if it is present in the SIP request,

  - The MIME From header value for a message sent between two users is set to the address of the originator of the message or legacy message retrieved from the corresponding authenticated originator's CPM Address in the associated SIP request or response, and
  - The MIME From header value for a message sent within a Group Chat is set to the address of the originator of the message or legacy message retrieved from the CPIM From header.

- Instead of setting the MIME To header to the address of the recipient of the CPM request or legacy message retrieved from the authenticated recipient's CPM Address in the 200 "OK" SIP response to the SIP request,

  - The MIME To header value for a message sent between two users is set to the address of the recipient of the message or legacy message retrieved from the corresponding authenticated originator's CPM Address in the associated SIP request or response, and
  - The MIME To header value for a message sent within a Group Chat is set to the address of the recipient of the message retrieved from the CPIM To header. In a message being sent by a participant to the other Group Chat participants, this is the address of the Group Chat session identity, and in a message being received by a participant in the Group Chat, it is the address of the participant.

NOTE: an earlier version of RCS defined a header called RCS-SMS-Content. This header is now replaced with the CPM defined header Message-Correlator.

5.2.2 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 5.2.6 and 5.2.7)

5.2.2.1 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.

5.2.3 Session Info Object

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- Refer to section 6.3.5

5.2.3.1 Application/X-CPM-Session Content Type Definition

No differences with [CPMMSGSTORE].

5.2.4 Group State Object

Following differences with [CPMMSGSTORE]:

For RCS, the XML schema of the Group State Object is defined as follows:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:xml="http://www.w3.org/XML/1998/namespace"
elementFormDefault="qualified">
    <xs:import namespace="http://www.w3.org/XML/1998/namespace"
            schemaLocation="http://www.w3.org/2009/01/xml.xsd"/>

    <xs:element name="groupstate">
      <xs:complexType>
        <xs:sequence>
          <xs:element name="participant" maxOccurs="unbounded">
            <xs:complexType>
              <xs:attribute name="name" type="xs:string" use="required"/>
              <xs:attribute name="comm-addr" type="xs:anyURI" use="required"/>
            </xs:complexType>
          </xs:element>
          <xs:element name="status" minOccurs="0">
            <xs:complexType>
              <xs:choice>
                <xs:element name="removed">
                  <xs:complexType>
```

```xml
                    <xs:sequence>
                        <xs:element name="participant" minOccurs="0">
                            <xs:complexType>
                                    <xs:attribute name="name" type="xs:string" use="required"/>
                                    <xs:attribute name="comm-addr" type="xs:anyURI" use="required"/>
                            </xs:complexType>
                        </xs:element>
                        <xs:attribute name="referred-by" type="xs:anyURI"/>
                        <xs:anyAttribute processContents="lax"/>
                    </xs:sequence>
                </xs:complexType>
            </xs:element>
            <xs:any minOccurs="0" maxOccurs="unbounded" processContents="lax"/>
          </xs:choice>
          <xs:anyAttribute namespace="##other" processContents="lax"/>
        </xs:complexType>
      </xs:element>
      <xs:element name="subject" type="subject-type"/>
      <xs:element name="icon" type="icon-type"/>
      <xs:attribute name="lastfocussessionid" type="xs:string" use="required"/>
      <xs:attribute name="iw-number" type="xs:anyURI" use="required"/>
      <xs:attribute name="timestamp" type="xs:dateTime" use="required"/>
      <xs:attribute name="group-type" type="groupType" use="required"/>
      <xs:anyAttribute processContents="lax"/>
    </xs:sequence>
    <xs:any minOccurs="0" maxOccurs="unbounded" processContents="lax"/>
  </xs:complexType>
</xs:element>

<xs:simpleType name="groupType">
  <xs:restriction base="xs:normalizedString">
    <xs:enumeration value="Closed"/>
    <xs:enumeration value="Open"/>
  </xs:restriction>
</xs:simpleType>

<xs:element name="icon-type">
  <xs:complexType>
    <xs:choice>
      <xs:element name="icon-uri" type="xs:anyURI"/>
      <xs:element name="file-info" type="xs:string"/>
      <xs:any minOccurs="0" maxOccurs="unbounded" processContents="lax"/>
    </xs:choice>
  </xs:complexType>
  <xs:any namespace="##other" processContents="lax"/>
</xs:element>

<xs:element name="subject-type">
    <xs:complexType>
        <xs:sequence>
            <xs:element name="subject" type="xs:string"/>
            <xs:element name="participant" type="participant-type" minOccurs="0"/>
            <xs:element name="timestamp" type="dateTime" minOccurs="0"/>
            <xs:any minOccurs="0" maxOccurs="unbounded" processContents="lax"/>
        </xs:sequence>
        <xs:anyAttribute namespace="##other" processContents="lax"/>
    </xs:complexType>
```

```
    </xs:element>

</xs:schema>
```

Table 1: XML schema of the Group State Object

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   Conversation History Folder

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- 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.

5.2.7   Session History Folder

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- 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.

5.2.8   User Folder

No differences with [CPMMSGSTORE].

5.2.9   Non-CPM Folders

No differences with [CPMMSGSTORE].

5.2.9.1   Non-CPM Objects

No differences with [CPMMSGSTORE].

In addition to what is defined in [CPMMSGSTORE]:

Voicemail related data shall be stored by the voicemail server in a dedicated folder within the recipient user's Common Message Store, using the following structure:

- VV-Mail is a folder dedicated for voicemail related data. The VV-Mail folder shall be created at the same level as the user's Default folder and contains specific subfolders:

  - Inbox is a folder– dedicated to store user's voicemail message objects, video mail message objects and fax message objects.

Voicemail messages are archived by setting the Archived flag. There is a VV-Mail folder and
Inbox subfolder structure similar to regular messages. The VoiceMail Server (VMS) shall
have direct read/write access permission for voicemail related data stored in the VV-Mail
sub-folders using IMAP as described in [RCS6.0].

The Voicemail Object is defined in [VVM]:
- The mail headers of the message object are given in Table 2 below and extend on
  those provided in [VVM].
- The message body encapsulates a [OMA-EVVM] voicemail object (identical to [VVM]
  object).

Mail Header	Status	Content
From	Mandatory	The submitter of the voice mail.
To	Mandatory	The recipient fo the voice mail
Date	Mandatory	The date at which the voice mail was submitted
Subject	Optional	If present, the subject of the voice mail
Conversation-ID	Mandatory	It shall be assigned by the entity that stores the message. Set to the calling party's MSISDN or TEL URI. If this information is not available, a generated value according to [RFC4122]. NOTE: The ABNF for this field is described in Appendix C of [CPMMSGSTORE].
Contribution-ID	Mandatory	It shall be assigned by the entity that stores the message. Set to a unique value according to [RFC4122]. NOTE: The ABNF for this field is described in Appendix C of [CPMMSGSTORE].
IMDN-Message-ID	Mandatory	It shall be assigned by the entity that stores the message. Set to the unique message identifier (as known to the VMS). NOTE: The ABNF for this field is described in Appendix C of [CPMMSGSTORE].
Message-Context	Mandatory	This MIME header field is defined in [RFC3458] and shall be set to the value "voice-message". NOTE: The ABNF for this field is described in Appendix C of [CPMMSGSTORE].
Content-Type	Mandatory	It shall be set to the following value: "multipart/voicemail"
Message-ID	Mandatory	It shall be assigned by the entity that stores the message. Set to a unique message identifier (as known to the VMS).

Mail Header	Status	Content
Message-body	Mandatory	Encapsulated MIME object as defined in [OMA-EVVM] (identical to [VVM]). or Encapsulated MIME object with a message reference link (message reference is within the MIME object)

Table 2: Mail headers for the Voicemail Object

Examples of a Voicemail object are shown below.

Example 1: Example of a Voicemail Object:

> NOTE: The message body is encoded in base64, and is not shown in the example
> for demonstration purposes. The base64 encoded parts are marked in grey
> background for representation purposes.

```
subject: voice mail
MIME-Version: 1.0 (Voice Version 2.0)
Message-Id: <31.24.2326006@msu31_24>
Content-Type: multipart/voice-message;boundary="BoundaryCCJD0"
Conversation-Id: abcdef-1234-5678-90ab-cdef01234567
Contribution-Id: f81d4fae-7dec-11d0-a765-00a0c91e6bf6
IMDN-Message-ID: <31.24.2326006@msu31_24>
From: 771004@vi.com
To: 771000@vi.com
Content-Duration: 17
Message-Context: voice-message
Date: Tue, 19 Dec 2006 10:12:09 +0000 (UTC)


--BoundaryCCJD0
Content-Type: text/Plain
Content-Transfer-Encoding: 7bit

click on attachment

--BoundaryCCJD0
Content-Type: audio/amr
Content-Transfer-Encoding: base64  Content-Disposition: attachment;
filename="vm.amr"
Content-Duration: 17

[message attachment]

--BoundaryCCJD0--
```

Example 2: Example of a Voicemail Object with message reference link:

NOTE: The message body includes the reference link to the actual voicemail message.

```
subject: voice mail
MIME-Version: 1.0 (Voice Version 2.0)
Message-Id: <31.24.2326006@msu31_24>
Content-Type: Multipart/voice-message;boundary="BoundaryCCJD0"
Conversation-Id: abcdef-1234-5678-90ab-cdef01234567
Contribution-Id: f81d4fae-7dec-11d0-a765-00a0c91e6bf6
IMDN-Message-ID: <31.24.2326006@msu31_24>
From: 771004@vi.com
To: 771000@vi.com
Content-Duration: 17
Message-Context: voice-message
Date: Tue, 19 Dec 2006 10:12:09 +0000 (UTC)


--BoundaryCCJD0
Content-Type: Text/Plain
Content-Transfer-Encoding: 7bit

Click on the link below
<HTTP URL for the voicemail message file>

--BoundaryCCJD0--
```

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]:

- The $Forwarded flag is not applicable for RCS.

6   Procedures at Message Storage Client

Following difference with [CPMMSGSTORE]:

- The "XLIST-CHANGEDSINCE" IMAP4 extension as defined in Appendix J is mandatory for RCS
- The "ACL" IMAP4 extension defined in RFC 4314 is not applicable for RCS
- The "CONDSTORE" IMAP4 extension defined in RFC 7162 is mandatory for RCS
- The "QRESYNC" IMAP4 extension defined in RFC 7162 is mandatory for RCS
- The "URLAUTH" IMAP4 extension defined in RFC 4467 is not applicable for RCS
- The "ENABLE" IMAP4 extension defined in RFC 5161 is mandatory for RCS

- The "METADATA" IMAP4 extension defined in RFC 5464 is not applicable for RCS
- The "ANNOTATE" IMAP4 extension defined in RFC 5257 is not applicable for RCS
- The "CONVERT" IMAP4 extension defined in RFC 5259 is not applicable for RCS

6.1   General Operations

6.1.1   Authenticate Operation

No differences with [CPMMSGSTORE].

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

No differences with [CPMMSGSTORE].

Following clarifications for RCS:

- Based on the clarifications for RCS listed under section 6 above: RFC 5257 ("ANNOTATE") is not applicable to RCS.
- As per [RCS-CONVENDORS], 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 be stored in a folder identified by the identity of the Contact in the Conversation as defined in [CPMMSGSTORE]. This identity shall be determined based on the Authenticated Originator's Address that is part of the signalling.

  - If a global E.164 phone number is available, that shall be used in the global-number representation of a tel URI as defined in [RFC3966]. Parameters are not used in the folder name.
    Example: tel:+4917123456789

  NOTE: RCS user clients storing messages in the Common Message Store may not have sufficient information to normalize all destination addresses to global E.164 phone number format. In this case the folder name may be formatted as defined below for non E.164 numbers.

  - If a non E.164 phone number is available, it shall be used in the local-number representation of a tel URI as defined in [RFC3966]. These numbers are typically short codes used for addressing of value added services outside the public numbering plan. Parameters and context are not used in the folder name.
    Example: tel:22632677
  - Phone numbers are typically derived from

- tel URI in SIP Signalling
- SIP URI in SIP signalling if appended by user=phone parameter
- SMS Originator Address
- SMS Destination Address
- MMS Originator Address
- MMS Recipient Address

- If a SIP URI is available it shall be used as defined in [RFC3261] after converting it to lower case first. Parameters shall not be included in the folder name.
  Example: sip:joe@example.com
  SIP URIs are typically derived from:

  - SIP URI in SIP signalling if not appended by user=phone parameter

- If an e-mail address is available it shall be used as mailto URI [RFC6068] after converting characters to lower case first.
  Example: mailto:joe@example.com
  e-mail addresses are typically derived from

  - MMS Originator Address
  - MMS Recipient Address

- If an alphanumeric address is available it shall be used with no conversion. These addresses are typically display names from SMS value added services without a routing address.
  Example: ACME Corporation
  Alphanumerical addresses are typically derived from

  - SMS Originator Address

- Entities managing folder names in the Common Message Store shall comply with the mailbox international naming conventions defined in [RFC3501].

NOTE: Folder Naming for MMS multiple recipients is for further study.

As a clarification for RCS

- An RCS Message Store Client using the Object Store operation may provide an initial set of metadata flags

6.3.2   Object Fetch Operation

No differences with [CPMMSGSTORE].

6.3.3   Object Preview Fetch Operation

Following differences with [CPMMSGSTORE]:

- Not applicable since RFC 5259 ("CONVERT") is not applicable to RCS as per section 6 above

6.3.4   Object Copy Operation

No differences with [CPMMSGSTORE].

6.3.5   Object Remove Operation

Following differences with [CPMMSGSTORE]:

- The RCS client SHALL NOT expunge messages from the Default folder. The RCS client may allow the user to restore deleted messages.
- The RCS client should expunge messages to remove messages permanently from user defined folders, but only once the RCS client confirms from the user there is no need to restore the deleted messages.

As a clarification for RCS:

- The RCS user shall be able to preserve objects that are scheduled for deletion by setting the Archived flag.
- The associated session info object shall be deleted only when the last message object related to this session in the session history folder is deleted.
- The conversation history folder shall be deleted only when the last object related to this conversation is deleted.
- For message removal by clients: When the client deletes a message from the Default folder from one device, all other clients belonging to the user shall no longer display that message. Procedures for RCS are defined in [RCS6.0].
- For message removal by the server: When the server deletes (expunges) messages in the Default folder (e.g. because of message expiry), the client shall not remove these same messages from their own device.

6.4   Folder Operations

6.4.1   Folder Create Operation

No differences with [CPMMSGSTORE].

6.4.2   List Folder Operation

Following differences from [CPMMSGSTORE]:

- After initial synchronization, the Message Storage Client SHALL make use of the LIST-STATUS operation as defined in [RFC5819] for any subsequent folder synchronization, instead of SHOULD. Also, if the server supports XLIST-CHANGEDSINCE, the Message Storage Client SHALL make use of XLIST-CHANGEDSINCE instead of or in conjunction with LIST-STATUS.

6.4.3   Folder Move Operation

No differences with [CPMMSGSTORE].

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

6.4.5   Folder Search Operation

No differences with [CPMMSGSTORE].

6.5   Reference Operations

6.5.1   Generate Reference Operation

Following differences from [CPMMSGSTORE]: Not applicable since RFC 4467 ("URLAUTH") is out of scope RCS as per section 6 above.

6.5.2   Fetch by Reference Operation

Following differences from [CPMMSGSTORE]: Not applicable since RFC 4467 ("URLAUTH") is out of scope for RCS as per section 6 above.

6.6   Metadata Management Operations

No differences with [CPMMSGSTORE].

6.6.1   Metadata Update Operation

Following differences with [CPMMSGSTORE] based on the clarifications for RCS listed under section 6 above: RFC 5257 ("ANNOTATE") and RFC 5464 ("METADATA") are not applicable to RCS.

6.6.2   Metadata Fetch Operation

Following difference with [CPMMSGSTORE] based on the clarifications for RCS listed under section 6 above: RFC 5257 ("ANNOTATE") is not applicable to RCS.

6.7   Synchronization

Following difference with [CPMMSGSTORE]: based on the clarifications for RCS listed in section 6 above: RFC 5161 ("ENABLE"), RFC 7162 ("CONDSTORE" and "QRESYNC") and XLIST-CHANGEDSINCE" (Appendix J) are mandatory for RCS.

As a clarification for RCS:

- An RCS client will present message objects in a conversation history folder or a session history folder from the Default folder of the Message Store 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 folder of the Message Store has been marked for deletion and expunged by the server (e.g. the expiration time for that object is in the past), the client shall not remove the object from its local storage and shall continue to present the object in the relevant conversational view.

- If an RCS client finds that an object in a conversation history folder in the "Default folder of the Message Store has been marked for deletion, the client shall remove the object from its local storage and thus shall not present the object in any conversational view.

6.8 Notification Operations

No differences with [CPMMSGSTORE].

7 Procedures at Message Storage Server

Following difference with [CPMMSGSTORE]:

- The "XLIST-CHANGEDSINCE" IMAP4 extension as defined in Appendix J is mandatory for RCS
- The "ACL" IMAP4 extension defined in RFC 4314 is not applicable for RCS
- The "CONDSTORE" IMAP4 extension defined in RFC 7162 is mandatory for RCS
- The "QRESYNC" IMAP4 extension defined in RFC 7162 is mandatory for RCS
- The "METADATA" IMAP4 extension defined in RFC 5464 is not applicable for RCS
- The "ANNOTATE" IMAP4 extension defined in RFC 5257 is not applicable for RCS
- The "CONVERT" IMAP4 extension as defined in RFC 5259 is not applicable for RCS
- The "URLAUTH" IMAP4 extension defined in RFC 4467 is not applicable for RCS
- The "ENABLE" IMAP4 extension defined in RFC 5161 is mandatory for RCS
- The "METADATA" IMAP4 extension defined in RFC 5464 is not applicable for RCS

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

Following difference from [CPMMSGSTORE]: based on the clarifications for RCS listed
under section 7 above: RFC 5229 ("CONVERT") is not applicable for RCS.

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 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
  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 they 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.

  - To allow a user's other devices to detect a message deleted by a device, the
    server should not expunge messages in the Default folder until they are to be
    expunged according to operator policy (e.g., at message expiry time).

- The Message Storage Server shall only expunge messages from a user defined folder if requested to do so by the user.

7.4   Metadata Management Operation

No differences with [CPMMSGSTORE].

7.4.1   Metadata Update Operation

Following difference with [CPMMSGSTORE]: based on the clarifications for RCS listed under section 7 above: RFC 5257 ("ANNOTATE") and RFC 5464 (METADATA") are not applicable for RCS.

7.4.2   Metadata Fetch Operation

Following difference with [CPMMSGSTORE]: based on the clarifications for RCS listed under section 7 above: RFC 5257 ("ANNOTATE") and RFC 5464 (METADATA") are not applicable for RCS.

7.5   Folder Operations

7.5.1   Folder Create Operation

No differences with [CPMMSGSTORE].

7.5.2   List Folders Operation

Following differences with [CPMMSGSTORE], based on the clarifications for RCS listed under section 7 above:

- The "XLIST-CHANGEDSINCE" IMAP4 extension as defined in Appendix J is mandatory for RCS.

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

7.6.1   Generate Reference Operation

Following difference from [CPMMSGSTORE]: based on the clarifications for RCS listed under section 7 above: RFC 4467 ("URLAUTH") is out of scope for RCS.

7.6.2   Fetch by Reference Operation

Following difference from [CPMMSGSTORE]: based on the clarifications for RCS listed under section 7 above: RFC 4467 ("URLAUTH") is out of scope for RCS.

7.7   Message and History Synchronization Operations

Following difference from [CPMMSGSTORE] based on the clarifications for RCS listed under section 7 above: RFC 5161 ("ENABLE"), RFC 7162 ("CONDSTORE" and "QRESYNC") and Appendix J ("XLIST-CHANGEDSINCE") are mandatory for RCS.

7.8   Notifications 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.

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 MIME headers for IMAP OBJECTS

No differences with [CPMMSGSTORE],

C.1. Conversation-ID MIME header field

No differences with [CPMMSGSTORE].

C.2. Contribution-ID MIME header field

No differences with [CPMMSGSTORE].

C.3. InReplyTo-Contribution-ID MIME header field

No differences with [CPMMSGSTORE].

C.4. IMDN-Message-ID MIME header field

No differences with [CPMMSGSTORE].

C.5. P-Asserted-Service MIME header field

No differences with [CPMMSGSTORE].

C.6. Message-Correlator MIME header field

No differences with [CPMMSGSTORE].

Appendix D.   Example of Session History Folder

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 example

No differences with [CPMMSGSTORE].

Appendix H.   CPM METADATA annotations (Normative)

Following differences with [CPMMSGSTORE]:

- Based on the clarifications for RCS listed under section 6 and 7 above: RFC 5464 ("METADATA") is not applicable for RCS.
- the "default" system folder DefaultFolderLocation is actually called "Default" and is at the root level

H.1. Metadata entry formats

Not applicable for RCS.

H.1.1.   DefaultFolderLocation

Following differences with [CPMMSGSTORE]:

- based on the clarifications for RCS listed under section 6 and 7 above RFC 5464 ("METADATA") is not applicable for RCS
- the "default" system folder DefaultFolderLocation is called "Default" and is at the root level.

Appendix I.   Representation of CPM Conversations in the CPM Message Store (Informative)

I.1. Standalone exchanges

No differences with [CPMMSGSTORE].

I.2. Chat exchanges example

No differences with [CPMMSGSTORE].

I.3. Long-lived chat exchanges

No differences with [CPMMSGSTORE].

As a clarification for RCS:

- Only one Group Chat session history folder is supported inside a conversation history folder.

I.4. Standalone to 1-1 chat

No differences with [CPMMSGSTORE].

I.5. Extending 1-1 chat to group chat

Following differences with [CPMMSGSTORE]:

- This use case is not applicable for RCS

I.6. Conversation via parallel channels

No differences with [CPMMSGSTORE].

APPENDIX J.   List Folder Operations (Normative)

J.1. XLIST-CHANGEDSINCE Overview

No differences with [CPMMSGSTORE].

J.2. Advertising Support for XLIST-CHANGEDSINCE

No differences with [CPMMSGSTORE].

J.3. XLIST-CHANGEDSINCE Handling

No differences with [CPMMSGSTORE].

J.4. LIST Command Changes

No differences with [CPMMSGSTORE].

J.5. Behaviour for Mailboxes with NOMODSEQ

No differences with [CPMMSGSTORE].

J.6. Formal Syntax

No differences with [CPMMSGSTORE].

APPENDIX K.   CPM-defined IMAP MetadataFlag

K.1. Archived

No differences with [CPMMSGSTORE].

Document Management

Document History

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