



## **Rich Communication Suite Release 2**

### **Technical Realization**

**1.1**

**February 25, 2010**

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# 1 INTRODUCTION

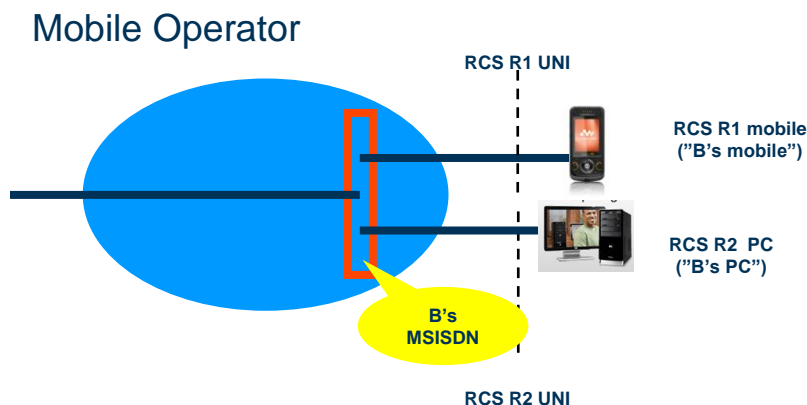
## 1.1 Overview

This document describes architecture & technical details needed for Rich Communication Suite, (RCS) Release 2.

For general overview of RCS including high-level requirements, please see for example document [FUNCDESC].

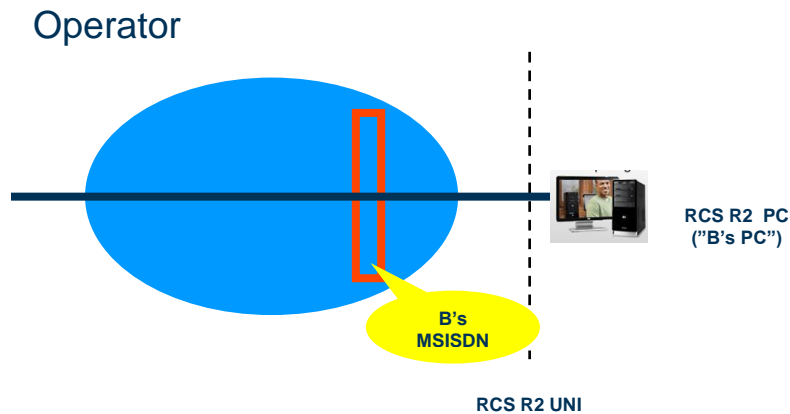
A major addition in RCS Release 2 is the RCS Release 2 client using broadband access. Such client can operate in two significantly different modes:

1. As a secondary client, adding performance (such as larger keyboard, a screen with higher resolution and so on) to the primary mobile client with RCS Release 1 functionality. Such secondary client is designed with UX aspects, storage accessibility and so on in mind, but is not designed to act as a primary telephony device. In this case the primary client retains aspects a user would associate with his telephone, for example regulatory functions, quality of service and full access to the telephony functions. It is expected that the user can synchronize his two devices in terms of user data, user requested functionality and display to the other user



**Figure 1: RCS Release 2 broadband client used as a secondary client**

2. As a primary client, replacing the user's mobile client (for example an RCS Release 2 client on a notebook using PS only Mobile Broadband access). A primary client has to meet all regulatory requirements (emergency calling, lawful intercept etc), perform to meet the traditionally expected telephony functionality (such as supplementary services) and also demonstrate reliability, performance and quality of service of a primary telephone



**Figure 2: RCS Release 2 broadband client used as a primary client**

Only the 1<sup>st</sup> use case is in scope of RCS Release 2. The 2<sup>nd</sup> use case might be included in the scope of RCS Release 3 or some later release.

## 1.2 Scope

The scope of the document includes only the RCS Release 2. For the technical details of RCS Release 1 see [RCSTR1].

## 1.3 Definition of Terms

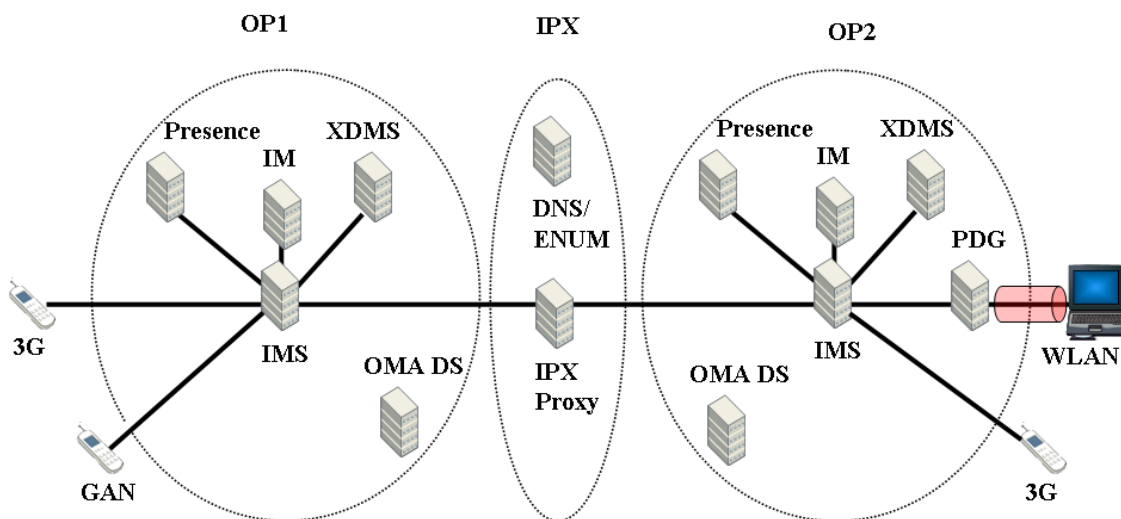
Term	Description
Broadband Client	Non-CS capable client utilizing IP based broadband access network for RCS services, used as a secondary client in RCS Release 2. For example, but not limited to, a PC using WLAN
CS	Circuit Switched (for example "CS Voice" used in the access network such as GSM or UMTS natively supporting the circuit switched voice service)
EAB	Enhanced Address Book
IMS	IP Multimedia Subsystem
MGW	Media Gateway, used, for example, for performing the conversion between CS and PS voice
MMTel	IMS Multimedia Telephony Service, used as the solution for offering the PS Voice service in RCS Release 2
Mobile Client	CS capable client utilizing cellular access network for RCS services, used as a primary client in RCS Release 2. For example 2G/3G mobile phone
NAB	Network Address Book
NNI	Network-to-Network Interface, used for inter-operator connectivity
PS	Packet Switched (for example "PS Voice" used in the IP based access networks such as ADSL, WLAN or LTE)
RCS	Rich Communication Suite (provides a feature-rich portfolio of services to unleash the communities hidden in a user's phone book)
Served RCS Presentity	The RCS User on whose behalf the RCS Client acts as Presence Source
UNI	User-to-Network Interface, used for access network connectivity

## 1.4 References

[23.204]	TS 23.204: Support of Short Message Service (SMS) over generic 3GPP Internet Protocol (IP) access; Stage 2, v8.4.0 <a href="http://www.3gpp.org">http://www.3gpp.org</a>
[24.229]	TS 24.229: Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3, v7.13.1 <a href="http://www.3gpp.org">http://www.3gpp.org</a>
[24.341]	TS 24.341: Support of SMS over IP networks; Stage 3, v8.1.0 <a href="http://www.3gpp.org">http://www.3gpp.org</a>
[24.173ENDORSE]	RCS Endorsement of 3GPP TS 24.173 MMTel
[26.114ENDORSE]	RCS Endorsement of 3GPP TS 26.114 MMTel Media Handling
[FUNCDESC]	RCS Functional Description <a href="http://www.gsmworld.com">http://www.gsmworld.com</a>
[IMENDORSE]	RCS Endorsement of OMA SIP/SIMPLE IM 1.0 <a href="http://www.gsmworld.com">http://www.gsmworld.com</a>
[IMAGESHARE]	PRD IR.79 Image Share Interoperability Specification, 1.1, <a href="http://www.gsmworld.com/">http://www.gsmworld.com/</a>
[IR.65]	PRD IR.65 IMS Roaming & Interworking Guidelines, 3.6, <a href="http://www.gsmworld.com/">http://www.gsmworld.com/</a>
[MGMTOBJ]	RCS Management Objects
[OMADS]	DS Protocol, 1.2.1, <a href="http://www.openmobilealliance.org/">http://www.openmobilealliance.org/</a>
[PRESENCE]	Presence SIMPLE Specification, 1.1, <a href="http://www.openmobilealliance.org/">http://www.openmobilealliance.org/</a>
[Presence2.0_DDS]	Presence SIMPLE Data Specification, Draft Version 2.0, 15 October 2008 <a href="http://www.openmobilealliance.org/">http://www.openmobilealliance.org/</a>
[Presence2.0_TS]	Presence SIMPLE Specification, Draft Version 2.0, 14 October 2008 <a href="http://www.openmobilealliance.org/">http://www.openmobilealliance.org/</a>
[Presence_Content]	Presence Content XDM Specification, Draft Version 1.0, 01 October 2008 <a href="http://www.openmobilealliance.org/">http://www.openmobilealliance.org/</a>
[PRESENCEIG]	Implementation Guidelines for OMA Presence SIMPLE v1.1 Presence, <a href="http://www.openmobilealliance.org/">http://www.openmobilealliance.org/</a>
[PresenceXDM]	Presence XDM Specification, Approved Version 1.1 – 27 Jun 2008 <a href="http://www.openmobilealliance.org/">http://www.openmobilealliance.org/</a>
[RCSTRR1]	RCS Technical Realisation Release 1, 15th December 2008 <a href="http://www.gsmworld.com">http://www.gsmworld.com</a>
[RFC 3261]	RFC 3261: SIP: Session Initiation Protocol, June 2002 <a href="http://www.ietf.org">http://www.ietf.org</a>
[RFC 3966]	RFC 3966: The tel URI for Telephone Numbers, December 2004 <a href="http://www.ietf.org">http://www.ietf.org</a>
[RFC 4482]	RFC 4482: CIPID: Contact Information for the Presence Information Data Format, July 2006

	<a href="http://www.ietf.org">http://www.ietf.org</a>
[RLSXDM]	Resource List Server (RLS) XDM Specification Approved Version 1.1 – 27 Jun 2008, <a href="http://www.openmobilealliance.org/">http://www.openmobilealliance.org/</a>
[SharedXDM]	Shared XDM Specification, Approved Version 1.1 – 27 Jun 2008 <a href="http://www.openmobilealliance.org/">http://www.openmobilealliance.org/</a>
[SIMPLEIM]	Instant Messaging using SIMPLE, 1.0, <a href="http://www.openmobilealliance.org/">http://www.openmobilealliance.org/</a>
[VIDEOSHARE]	PRD IR.74 Video Share Interoperability Specification, 1.3, <a href="http://www.gsmworld.com/">http://www.gsmworld.com/</a>
[XDM1.1_AD]	XML Document Management Architecture, Approved Version 1.1, 27 June 2008 <a href="http://www.openmobilealliance.org/">http://www.openmobilealliance.org/</a>
[XDM2.0_AD]	XML Document Management Architecture, Candidate Version 2.0, 16 September 2008 <a href="http://www.openmobilealliance.org/">http://www.openmobilealliance.org/</a>
[XDM1.1_Core]	XML Document Management (XDM) Specification, Approved Version 1.1, 27 June 2008 <a href="http://www.openmobilealliance.org/">http://www.openmobilealliance.org/</a>
[XDM2.0_Core]	XML Document Management (XDM) Specification, Candidate Version 2.0, 16 September 2008 <a href="http://www.openmobilealliance.org/">http://www.openmobilealliance.org/</a>
[XDMIG]	Implementation Guidelines for OMA XDM v1.1, <a href="http://www.openmobilealliance.org/">http://www.openmobilealliance.org/</a>

## 2 RCS ARCHITECTURE



**Figure 3: Simplified Example of RCS Architecture**

Figure above shows a simplified example of an overall architecture for RCS Release 2.

## 3 GENERAL

### 3.1 Addressing

In the Release 2 a mobile RCS client and a broadband RCS client (such as PC client) belonging to the same subscriber share the same identity (MSISDN). This will be the identity of the primary device (that is, the one on the mobile network). As in Release 1, this identity is used to identify the subscriber when he/she sets up communication towards other users and by other users when they want to set up communication towards the subscriber owning multiple clients.

### 3.2 Registration

The broadband client shall register all feature tags as per service it supports, in the Contact header of a SIP REGISTER message. For information about the detailed structure of each feature tag related to the RCS Release 1 services, see Chapter 3.2 in [RCSTR1]. In addition, the broadband client shall register the two feature tags related to PS voice sessions in accordance with the [24.173ENDORSE] that is:

- +g.3gpp.icsi-ref="urn:urn-7:3gpp-service.ims.icsi.mmtel"
- audio

Note: RCS Release 2 Broadband Access clients shall register the +g.3gpp.cs-voice feature tag in order to provide good content sharing interoperability to mobile clients.

### 3.3 Provisioning

The provisioning parameters will be as specified in [MGMTOBJ].

For the delivery of the provisioning parameters to the broadband access clients several mechanisms are available. The optimal mechanism depends again on the deployment environment and type of clients. For that reason the delivery mechanism for provisioning parameters in broadband access is considered to be out-of-scope for the RCS Release 2.

### 3.4 Control of Service Delivery

When an end-user decides that he/she does not want to use a certain service on a secondary client, that client shall reject an incoming request related to that certain service, with SIP 486 without alerting the end-user. Furthermore the client won't offer the possibility to use the service anymore. This is valid until the end-user allows use of that certain service again. Note that this has no effect on the primary client.

By default all available services will be enabled on the secondary client.

The control of service delivery can be offered for following services:

- Voice Calls
- Chat
- Sending SMS
- File Transfer
- Video Sharing
- Image Sharing



The actual set of services on which the control of service delivery will be offered to the end user shall be a subset of the above list. Which services is part of that subset shall be determined by the client capabilities and an operator controllable parameter.

## **4 BROADBAND ACCESS**

### **4.1 Introduction**

Generally speaking the service related details of RCS do not change if the access network changes. For example, the Presence service-descriptions are similar regardless of the used access network. However on the broadband access supplementary services for voice calls are not considered.

### **4.2 Secure Access**

Access from untrusted broadband networks to the IMS core system is an integral part of RCS Release 2. This allows RCS services to be used in a common way regardless of what kind of access network is used.

By default trusted networks include WCDMA, GPRS/EDGE that are operator controlled, while untrusted broadband networks include for example, WLAN, ADSL and cable modem access that are controlled by some 3<sup>rd</sup> party. “Trusted” in this context means that the access network itself provides the necessary authentication and encryption for end-user traffic. The access network is integrated into the operator core infrastructure in such a way that the whole path from a mobile to services is secure and under the control of respective operators. “Untrusted” means that the network does not provide for example encryption natively, so it needs to be added there before that particular network can be used to access the IMS core system. Based on the definition of “trusted” and “untrusted”, any access technology can be considered “trusted” if it fulfils the definition of “trusted network”. Direct access from an untrusted broadband network such as public WLAN hotspot to the IMS core system should not be allowed due to security risks such as Denial of Service attacks towards operator core components. So there is a crystal clear need for additional secure access mechanisms to be deployed.

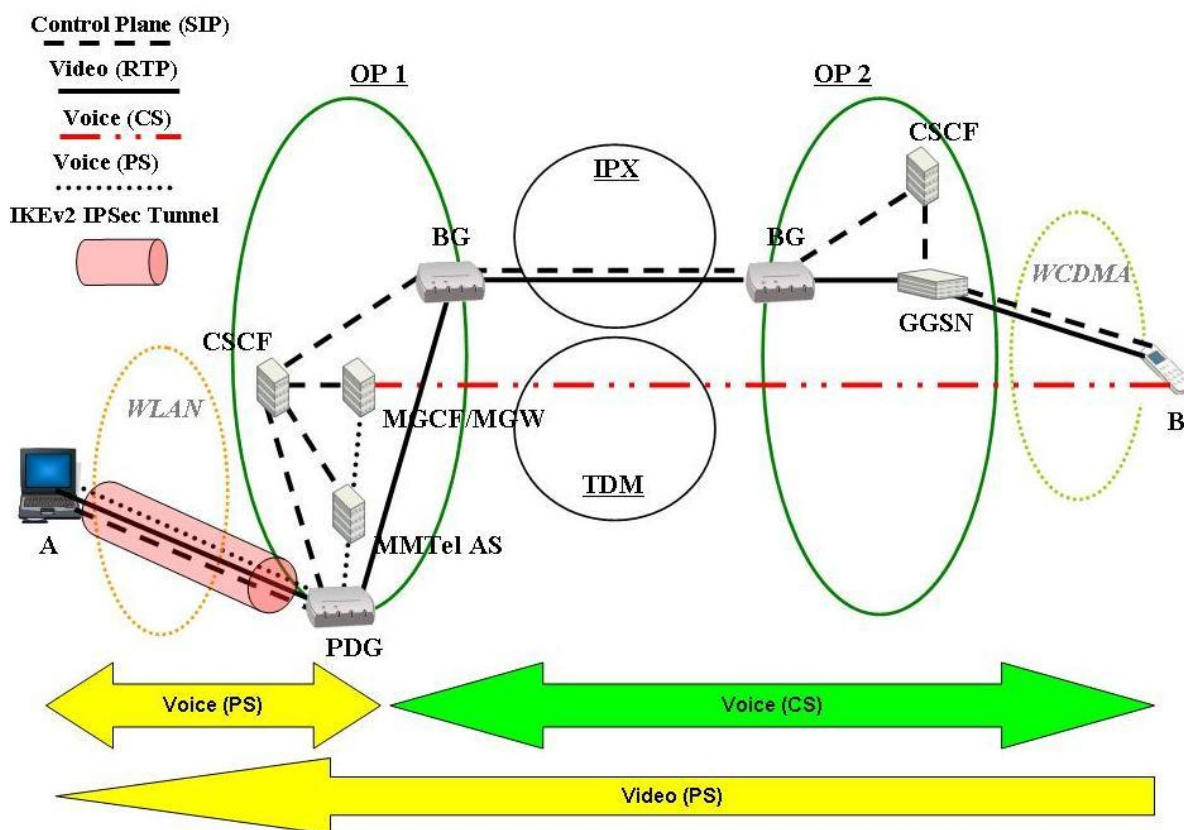
Many such secure access mechanisms are possible and for commercial deployments the choice will be dependent on the environment and the type of client (for example over PS only mobile broadband access, over the internet or only over a fixed DSL line might use different mechanisms). Given that this choice will end up to be specific to each deployment anyway, it isn’t considered in scope of RCS to specify an exhaustive list of supported access mechanisms. Only the plain HTTP Digest as an authentication mechanism to IMS services is required in order to have a common basis for the interoperability testing. However, that is not considered to be an optimal solution for long-term commercial deployment.

Both trusted and untrusted networks shall be able to provide access and authentication over NAT. This must be taken into account for example when xSIM based access or IPSec is used.

### 4.3 Broadband Access Example

This chapter illustrates how a Broadband client using PS voice from a non-mobile access network can be integrated as a part of the RCS architecture. Note that even though Video Share is used as an example in the text below, the general principles are applicable for all the other RCS services too.

In the example the secure access over the untrusted network is realized utilizing standardized 3GPP Rel-6 I-WLAN methods. In that case, an IKEv2 IPsec tunnel is formed between the terminal and the network over the untrusted broadband access network to ensure a secure mechanism to access the IMS core system. This tunnel can then be used by all RCS services for the transport of control plane & user plane traffic on the UNI. This is done using an IKEv2 client in the terminal and PDG (Packet Data Gateway) in the network.



**Figure 4: High-level Illustrative Architecture Example of Video Share Interconnection between a Mobile RCS User and a Broadband RCS User**

In Figure 4 broadband User A of Operator 1 and mobile User B of Operator 2 are connected via normal voice call, then User B wants to send video from her RCS Release 1 mobile terminal to User A's RCS Release 2 PC client thus initiating a Video Share session. Components used in this particular example:

- PS voice UNI (3GPP 24.173) for User A (he is using PC with WLAN access network)
- CS voice UNI (3GPP 24.008) for User B (she is using mobile terminal with WCDMA access network)
- CS voice NNI (that is, the traditional ISUP/SS7/TDM CS based interconnection network)

- PS Video Share (GSMA IR.74) used by both RCS clients end-to-end (that is, over both UNIs and the NNI)

Differences between a classical Video Share session between two mobile terminals and the example above:

- Voice part requires support for PS<=>CS voice conversion mechanism in the network (standard 3GPP specified MGCF / MGW architecture)
- Access over WLAN to IMS core system requires support for additional security mechanism (standard 3GPP specified IKEv2 / PDG architecture)
- For the video stream part there are no differences

For further details see documents [24.173ENDORSE] & [26.114ENDORSE].

## 5 VOICE

### 5.1 Introduction

Voice services are supported both on access networks offering natively the CS voice capability (thus without the need for CS/PS voice conversion performed by MGW and so on components in the core network) as well as on IP based access networks using PS voice. Using Video Share and Image Share in combination with PS voice on broadband access networks such as WLAN and ADSL are also in the scope for Release 2. See Chapter 8 for details on Video Share and Image Share handling.

Voice service used with Broadband access in RCS Release 2 is handled according to documents [24.173ENDORSE] & [26.114ENDORSE].

### 5.2 Multi-device handling

Within the RCS multi-device context, any of the user's clients could be receiving the final leg of the voice service either through the CS core network (for a mobile client) or through the IMS core network (that is, PS voice for clients using broadband access). This final leg is the determining factor for the UNI. Since for RCS Release 2, the number of voice calls in which both ends will be using broadband access will be very limited, RCS Release 2 will, like RCS Release 1, re-use the interconnection between the CS networks for the voice service NNI.

Between this UNI and NNI interfaces, several options are possible to achieve the required behaviour. The optimum choice depends on several factors, for instance:

- The type of clients to be deployed (for example possibility to have multiple mobile clients)
- The services that are already available in the CS network
- The way the IMS has been deployed

So there is no choice which is optimal in all circumstances. The choice that is made does not affect the UNI or the NNI interface though. Therefore this choice is considered to be out-of-scope for RCS Release 2.

### 5.3 Wideband Speech Communication Capabilities

It is recommended that RCS Client supports wideband speech communication capabilities based on Adaptive Multi Rate WideBand (AMR-WB) in CS voice call.

## 6 PRESENCE AND CAPABILITY DISCOVERY

### 6.1 Permanent Presence State Publication

The RCS Client shall support Permanent Presence State publication by manipulating the Permanent Presence State via an XDMC using the permanent presence state application as defined in [Presence2.0\_TS]. An RCS client shall update the permanent presence state document in such a way that elements in the document that are not changed or are even unknown to the RCS client (for example, because they were included by a client supporting a future RCS release), are not altered. In order to avoid inconsistencies between attributes and the actual element value, unknown attributes of changed elements shall be removed from the updated document.

This can be achieved both through a direct, conditional update of only the changed element itself or through a retrieval of the complete document followed by a client local update of the changed elements. This update should then be used in a conditional replace request for the entire permanent presence state document. The choice between both methods is left to client implementation and could even depend on the amount of updated elements.

The RCS Presence Server (PS) shall use the Permanent Presence State as input for Presence Information processing. RCS Presence Server should subscribe/fetch the permanent presence state document from Presence XDM when applying the composition policy.

Permanent Presence State publication applies to the following attributes of Social Presence Information as defined in [FUNCDESC]:

- Portrait icon
- Free text
- Favourite link

Permanent Presence State publication does not apply to the Hyper-availability attribute of Social Presence Information, as defined in [FUNCDESC]. Publication of Hyper-availability attribute is made via SIP PUBLISH method (that is, as in RCS Release 1).

Publication of service capabilities is also made via SIP PUBLISH method (that is, as in RCS Release 1).

### 6.2 Multi-device handling

This section details handling of presence by RCS Client in order to address the RCS Release 2 multi-device context.

Several situations can occur:

- One of the clients publishes an update of the presence document including new social presence information.  
In this case the other clients of the user will receive the update as part of a presence notification which will contain information about the own presentity. Such an update will either be received immediately when the client is online or the client will receive the update when it comes online. Clients shall take the updated social presence

information into account and update the presence information that they store locally in the client. In order to get the notifications that are necessary to provide this behaviour, the client shall include the own identity in the “rcs” list which is part of the Shared XDMS’s “resource-lists” document. It shall not allow the user to remove that entry

- The user owning multiple clients is invited by a contact to share social presence information.

All the user’s active clients will receive watcher information notifications both when the contact subscribes for the user’s social presence information (subscription entering the “pending” state) and when the user accepts or blocks the “invitation” on one of the his clients (subscription going out of the “pending” state). When the user accepts the invitation on one of his clients, the other clients will also start receiving the social presence information of the contact due to the symmetric subscription principle used in RCS. This is the case for both the clients that are online at the time of accepting the subscription as well as those that were offline. The latter will not be aware however of the fact that an invitation has been blocked. For that reason it is needed that the clients check whether the locally cached copy of the Shared XDMS’s “resource-lists” document is up to date when they come online, in case they cache this information locally.

- The user owning multiple clients invites a contact to share social presence information from one of his clients.

In this case his other clients will receive presence notifications indicating that a subscription to the contact entered the pending state and notifications including the other user’s social presence information when the contact accepted the “invitation”. If the contact blocks the “invitation”, there will be presence notifications to all the user’s clients indicating that the subscription was terminated. The clients shall use these unexpected notifications as triggers to update the locally stored copy of the Shared XDMS’s “resource-lists” document if they cache that kind of information locally. Again clients that cache this information locally, shall check that there copy is up-to-date when coming online as obviously they would not have received some of the triggers. Regardless of whether the user for which presence notifications were received can be found in the “rcs” list of the Shared XDMS’s “resource-lists” document, the RCS client will display the provided presence information if it refers to a known contact

- The user revokes the presence sharing with a contact from one of his clients. Again his other clients that are online will receive unexpected presence notifications indicating that the subscription to the contact’s social presence information was terminated. If they cache the information in the Shared XDMS’s “resource-lists” document locally, they shall use this notification as a trigger to verify that the information is still up-to-date. Clients that cache the information in the Shared XDMS’s “resource-lists” document locally shall check whether it is still up-to-date when coming online.

When a user decides that he doesn’t want to receive a certain service on one of his secondary clients, the given secondary client will not indicate the capability for that service in the services section of the presence document if such a capability is defined for the service.

### 6.3 Presence Capability Handling for PS Voice

The Broadband Client shall indicate the services it supports in the services section of the presence document in accordance with the Technical Realization document of Release 1. In

addition, the broadband access client shall indicate its support for PS voice according to 3GPP TS 24.173 with a service- and media description as follows:

Service-id: org.3gpp.urn:urn-7:3gpp-service.ims.icsi.mmtel  
Version: 1.0  
Media capabilities: audio, duplex  
Contact address type: TEL / SIP URI

Note: An RCS Release 2 watcher is not required to take any action on receipt of this service capability.

Following is an example document created for broadband access client according to the rules specified in this document (see tuple "a2" below for the PS voice capability declaration):

```
<?xml version="1.0" encoding="UTF-8"?>
<presence xmlns="urn:ietf:params:xml:ns:pidf"
  xmlns:op="urn:oma:xml:prs:pidf:oma-pres"
  xmlns:opd="urn:oma:xml:pde:pidf:ext"
  xmlns:c="urn:ietf:params:xml:ns:pidf:cipid"
  xmlns:pdm="urn:ietf:params:xml:ns:pidf:data-model"
  xmlns:rpid="urn:ietf:params:xml:ns:pidf:rpid"
  xmlns:caps="urn:ietf:params:xml:ns:pidf:caps"
  entity="tel:+1234578901">

  <tuple id="a1">
    <status><basic>open</basic></status>
    <op:service-description>
      <op:service-id>org.gsma.videoshare</op:service-id>
      <op:version>1.0</op:version>
    </op:service-description>
    <contact>tel:+1234578901</contact>
  </tuple>

  <tuple id="a12">
    <status><basic>open</basic></status>
    <op:service-description>
      <op:service-id>org.openmobilealliance:IM-Session</op:service-id>
      <op:version>1.0</op:version>
    </op:service-description>
    <contact>tel:+1234578901</contact>
  </tuple>

  <tuple id="a2">
    <status><basic>open</basic></status>
    <op:service-description>
      <op:service-id>org.3gpp.urn:urn-7:3gpp-service.ims.icsi.mmtel</op:service-id>
      <op:version>1.0</op:version>
    </op:service-description>
    <caps:servcaps>
      <caps:audio>true</caps:audio>
      <caps:duplex>
```

```

        <caps:supported>
        <caps:full/>
    </caps:supported>
</caps:duplex>
</caps:servcaps>
<contact>tel:+1234578901</contact>
</tuple>

<pdm:person id="a1233">
    <op:overriding-willingness opd:until="2008-10-28T21:00:00Z">
        <op:basic>open</op:basic>
    </op:overriding-willingness>
    <rpId:status-icon          opd:etag="26362">http://xcap.gsma.org/xcap-ap-
service/org.openmobilealliance.pres-
content/users/sip:1234578901@gsma.org/oma_status-
icon/rcs_status_icon</rpId:status-icon>
    <c:homepage>http://example.com/~alice</c:homepage>
    <pdm:note>I'll be PAG</pdm:note>
</pdm:person>

</presence>

```

## 7 ADDRESS BOOK

### 7.1 Enhanced Address Book

Enhanced Address Book (EAB) as defined in [RCSTR1] is a contact book application that makes the contacts a network service and enriches the contacts data provided by the Network Address Book (NAB) by integrating presence information.

RCS Release 2 SHALL support Enhance Address Book defined in [RCSTR1]

### 7.2 Network Address Book

Network Address Book (NAB) as defined in [RCSTR1] provides a mechanism for users to store and manage their address book contacts in a network. RCS Release 2 SHALL support Network Address Book as defined in [RCSTR1], with the following clarification:

#### 7.2.1 Notification

RCS release 2 notification mechanism in NAB is based on [RCSTR1] with the following clarification:

A mechanism/Notification means to push content to a broadband connected device has not been defined yet. It is therefore recommended for broadband connected devices to poll the NAB for any synchronization update by sending Sync request within certain intervals. How the polling is done, that is on manual or scheduled intervals. User and/or Operator settings is out of scope of this document

Note: There maybe time intervals when the broadband connected device will be out of sync with the network address book since the broadband connected device has no means of being timely notify of changes in the network address book.

### 7.3 Multiple Device

Since the address book synchronization is intended for usage in a multi-device context, there is little specific to be added here.

## 8 CONTENT SHARING

### 8.1 Multi-device handling

When the voice call is set up, the devices will exchange capabilities using a SIP OPTIONS query as described in [VIDEOSHARE] and [IMAGESHARE]. All the receiving user's RCS Release 2 clients that are capable of content sharing will receive and respond to the OPTIONS query. This is achieved through forking in the S-CSCF according to [24.229]. All RCS Release 2 devices will respond with a 200 OK response to the query and the S-CSCF will forward one of the responses to the client sending the query. When a 200 OK response to the OPTIONS is received, the content sharing options offered to the end user shall base on the capabilities returned in the OPTIONS query response and on the service capabilities obtained by means of presence (see chapter 6). If no capabilities have been exchanged with the conversation partner prior to the setup of the voice call (that is, the conversation partner is not in the phone book), only the capabilities returned in the response to the OPTIONS query shall be used.

Note: This takes care of the situation in which due to race conditions between the devices of the user receiving the OPTIONS query, it occurs that a sharing service that was available isn't offered.

Note2: any RCS Release 1 device that isn't involved in the voice call will answer the OPTIONS query with a 480 response.

Note3: This behaviour is only intended to affect the in-call content sharing capabilities. Like in RCS Release 1 it doesn't affect the capabilities shown in the enhanced address book.

When one of the users involved in the voice call wants to share some content, his client will send an INVITE request according to [VIDEOSHARE] and [IMAGESHARE] which will be forked to all content sharing capable clients of the conversation partner. When the user accepts on any client, his client shall respond with a 200 OK response. When he rejects the invitation on any client, the client shall respond with a 603 response. In both cases the invitation to his other clients will be cancelled according to [RFC 3261]. In case of an acceptance the content sharing media path will be set up to the client on which he accepted the invitation.

In order to provide this functionality, RCS Release 2 broadband access clients shall include the +g.3gpp.cs-voice feature tag in the Accept-Contact and Contact headers of both the SIP OPTIONS query and the INVITE request for content sharing. Unlike what is indicated in chapter 3.2 of [IMAGESHARE], RCS Release 2 broadband access clients shall not include



the MMTEL ICSI urn:urn-7:3gpp-service.ims.icsi.mmtel in these queries/requests. This behaviour is in line with the other chapters of [IMAGESHARE].

## 8.2 Video Codec for Video Share

It is strongly recommended that RCS Client supports video codec H264/AVC Baseline Profile Level 1b (using the RTP format in RFC 3984) and, when supported, lists this media format as first format being preferred in “m=” line in SDP (as defined in RFC 3264) for Video Share.

# 9 FILE TRANSFER

## 9.1 Multi-device handling

INVITE requests for file transfers will be forked to all the recipient's devices. If the recipient accepts the invitation, his client shall respond with a 200 OK response. In case he rejects the session, the client shall respond with a 603 response. In both cases, the IMS network of his operator will cancel the invitations to his other devices.

# 10 MESSAGING

## 10.1 Legacy messaging

Legacy messaging is realized using existing SMS and MMS services using a conversational view in RCS Release 2, as in Release 1. For a RCS broadband access client the legacy messaging functionality in RCS Release 2 is limited to sending SMS. Additional legacy messaging functionality beyond this is out of scope for RCS Release 2.

### 10.1.1 Multi-device handling

Only a device on mobile access will receive SMS and MMS messages. SMS messages sent by the RCS Broadband Access client will not be part of the conversational view on the mobile client. Replies to SMS messages sent by the RCS Broadband Access client are delivered to the mobile device only.

### 10.1.2 SMS service over broadband access

The procedures for sending SMS over a broadband access shall follow the procedures of 3GPP SMS over IP transport level interworking described in [23.204]. Specifically RCS Release 2 shall support the procedures of [23.204] chapter 6.3 and the procedures of [24.341] chapter 5.3.1.2 (Client), chapter 5.3.3.4.1 and 5.3.3.3 (IP-SM-GW), with the following clarifications;

- An RCS broadband client acts as a “SM-over-IP sender”.
- An RCS broadband client shall not request a Status Report. Support for Status Reports on a RCS broadband client requires possibility to receive SMS, which is out of RCS Release 2 scope.

## 10.2 Chat

The RCS Chat service as defined in [FUNCDESC] is based on OMA SIMPLE IM Session mode. 1-to-1 chat shall use “One to One Session Mode messaging” and Group Chat the “Ad-Hoc Session Mode messaging” following [SIMPLEIM] as described in [IMENDORSE].

### 10.2.1 Multi-device handling

#### 10.2.1.1 *Issuing an initial chat invitation*

The RCS Chat service is initiated through a Chat (that is, OMA SIMPLE IM) Session INVITE request including a Subject header as described in [IMENDORSE]. The Chat Session INVITE request is sent to the intended recipient (in case of a 1-1 chat) or to the conference focus (in case of a group chat). Note: The selection of party/parties can be done before or after writing the chat message.

For 1-1 chat, a new Chat session INVITE request (including a new subject header) may be sent to the same recipient even though a previously sent INVITE request still is pending. For Group Chat, any INVITE request is regarded as an invite to a new separate Group Chat session, even if it is to the same recipients as an INVITE request that is still pending.

#### 10.2.1.2 *Receiving a initial chat invitation*

The Chat Session INVITE request is forked to all the recipients' devices. The RCS Client handling at reception of a RCS Chat Session INVITE request is as described in [IMENDORSE]. When the Chat INVITE request has been accepted on one of the devices, the Chat INVITE requests to his other devices will be cancelled by the IMS network.

The continued chat message exchange will then be using the MSRP session established between the chat initiator's device and the device of the recipient that accepted the Chat Session, until either actively terminated by either user or due to inactivity.

If the recipient does not take any action on any of the devices that received the Session INVITE request the Chat Session invitation times out. Then the Chat INVITE requests will be cleared on all his devices using normal IMS/SIP procedures. This also applies to non-accepted Session INVITE requests where a later received session invitation was accepted by the RCS Client as described above.

If the RCS client implementation offers the user the possibility to reject the chat invite (before timed out), the RCS client shall respond to the INVITE request with a 603 response. The IMS network of his operator will cancel the INVITE requests to his other devices. The RCS client of the chat initiator should not indicate this rejection to the user.

If the recipient responds to the Chat Session INVITE request (as described above) on any device after the SIP Session INVITE request has timed out, a new initial Chat Session Invite procedure will be initiated by the RCS client.

For 1-1 chat, any subsequent chat INVITE request from the same originator for which there exists a chat session or a still pending chat invitation, is regarded as a continuation of the ongoing chat message exchange with this user.

For group chat, any INVITE request is regarded as an invite to a new separate Group Chat session, even if it is from the same originator as an existing Group Chat session or an INVITE request that is still pending.

### 10.3 Other Messaging Functions

Interworking between OMA SIMPLE IM based services and legacy services (SMS/MMS) is a study item for later Releases.

## 11 CHANGES COMPARED TO RELEASE 1

### 11.1 Introduction

The following issues are documented here for the purpose of describing the minimum set of changes required to the Release 1 based client for it to be able to communicate with the Release 2 based client and network.

### 11.2 XML Document Structure for Shared XDMS

*Note: update to [RCSTRR1] Chapter 4.4.2*

AUID: *resource-lists*

Document name: *index*

Template:

```

<?xml version="1.0" encoding="UTF-8"?>
<resource-lists xmlns="urn:ietf:params:xml:ns:resource-lists"
  xmlns:xd="urn:oma:xml:xdm:xcap-directory"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

  <!-- The list oma_buddylist contains references to any individual list used according to OMA IG for presence
  subscriptions. -->
  <list name="oma_buddylist">
    <external anchor="http://xcap.example.org/resource-lists/users/sip:RCSUser@example.org/index/~/resource-
    lists/list%5B@name=%22rcs%22%5D"/>
  </list>

  <!-- The list oma_grantedcontacts contains the list of all granted contacts -->
  <list name="oma_grantedcontacts">
    <external anchor="http://xcap.example.org/resource-lists/users/sip:RCSUser@example.org/index/~/resource-
    lists/list%5B@name=%22rcs%22%5D"/>
  </list>

  <!-- The list oma_blockedcontacts contains the list of all blocked contacts. -->
  <list name="oma_blockedcontacts">
    <external anchor="http://xcap.example.org/resource-lists/users/sip:RCSUser@example.org/index/~/resource-
    lists/list%5B@name=%22rcs_blockedcontacts%22%5D"/>
    <external anchor="http://xcap.example.org/resource-lists/users/sip:RCSUser@example.org/index/~/resource-
    lists/list%5B@name=%22rcs_revokedcontacts%22%5D"/>
  </list>

  <!-- The list of buddies the owner wants be able to get presence information for -->
  <!-- The RCS presentity is always part of this list, refer to § 11.4 -->
  <list name="rcs">
    <display-name>My presence buddies</display-name>
    <!-- The URI below is just an example of the own's user Id -->
    <entry uri="tel:+1234578901" />

  </list>
  <!-- The list of blocked contacts -->
  <list name="rcs_blockedcontacts">
    <display-name>My blocked contacts</display-name>

  </list>
  <!-- The list of revoked contacts -->
  <list name="rcs_revokedcontacts">
    <display-name>My revoked contacts</display-name>
    <entry uri="tel:+123456" xd:last-modified="2008-12-24T14:32:14Z"/>
  </list>
</resource-lists>

```

## 11.3 Publish

*Note: update to [RCSTRR1] Chapter 4.6*

Presence document is published by using the PUBLISH method as defined in [PRESENCE]. Format of the presence notification is as defined according to the Presence Data Model as describe above.

When the application is started on the terminal the client sends a PUBLISH request according to the Presence Data Model. RCS Client shall support Permanent Presence State publication by manipulating the Permanent Presence State via an XDMC using the permanent presence state application as defined in [Presence2.0\_TS]. An RCS client shall update the permanent presence state document in such a way that elements in the document that are not changed or are even unknown to the RCS client (for example, because they were included by a client supporting a future RCS release), are not altered. In order to avoid inconsistencies between attributes and the actual element value, unknown attributes of changed elements shall be removed from the updated document.

This can be achieved both through a direct, conditional update of only the changed element itself or through a retrieval of the complete document followed by a client local update of the changed elements. This update should then be used in a conditional replace request for the entire permanent presence state document. The choice between both methods is left to client implementation and could even depend on the amount of updated elements.

RCS Presence Server(PS) shall use the Permanent Presence State as input for Presence Information processing. RCS PS should subscribe/fetch the permanent presence state document from Presence XDM when applying the composition policy.

A presence modify request is sent using the 'Sip-If-Match' header according to [PRESENCE].

Permanent Presence State publication applies to the following to the following listed Presence information elements:

- Portrait icon
- Free text
- Favourite link

The Publication of Hyper-availability and Service Capability are made via SIP PUBLISH Method.

## 11.4 Subscribing to own Presence Information

*Note: new sub-section 4.11 to [RCSTRR1] Chapter 4*

An RCS client may need to handle (for example, to display or to publish) Presence information about the Served RCS Presentity.

In this case the RCS client shall subscribe to the Presence Document of the served presentity. To realize that own Presentity's identity is added (and can not be removed by the end user) to the "rcs" list associated with the Presentity.

## 11.5 Service Capabilities Query During a Call

*Note: addition to [RCSTRR1] Chapter 4.9.5*

In future RCS releases featuring support for multiple devices of the same user, it could occur that a 200 OK response to the OPTIONS query doesn't provide all content sharing services that are available at that moment. In order to cope with this situation an RCS R1 client that receives a 200 OK response to the OPTIONS query it sent, shall combine the capabilities it received in that response with the content sharing service capabilities obtained through presence (see Chapter 4.2.3) and present that combination as the available content sharing services during a voice call to the end user. If no capabilities have been exchanged with the conversation partner prior to the setup of the voice call (that is, the conversation partner is not in the phone book), only the capabilities returned in the response to the OPTIONS query shall be presented.

## 11.6 Issuing an Initial Chat Invitation

*Note: new sub-section 8.2.1 to [RCSTRR1] Chapter 8.2*

The RCS Chat service is initiated through a Chat (that is, OMA SIMPLE IM) Session Invite including a Subject header as described in [IMENDORSE]. The Chat Session Invite is sent to the intended recipient (in case of a 1-1 chat) or to the conference focus (in case of a group chat).

Note: The selection of party/parties can be done before or after writing the chat message.

A new Chat Session Invite (including a new subject header) may be sent even though a previously sent invite still is pending.

## 11.7 Receiving an Initial Chat Invitation

*Note: new sub-section 8.2.2 to [RCSTRR1] Chapter 8.2*

Reception of a RCS Chat Session invite is as described in [IMENDORSE]. The continued chat message exchange will be using the MSRP session established between the chat initiator's device and the device of the recipient that accepted the Chat Session, until either actively terminated by either user or due to inactivity.

If the recipient does not take any action the Chat Session invitation times out. Then the chat invitation will be cleared using normal IMS/SIP procedures. This also applies to non-accepted Session invitations where a later received session invitation was accepted by the RCS Client as described above.

If the RCS client implementation offers the user the possibility to reject the chat invite (before timed out), the RCS client shall follow the session response behaviour described in chapter 3.3. The RCS client of the chat initiator should suppress (not display) this message.

If the recipient responds to the Chat Session Invite (as described above) after the SIP Session Invite has timed out, a new initial Chat Session Invite procedure will be initiated by the RCS client.

## APPENDIX A: SIGNALLING SEQUENCES (INFORMATIVE)

Note: The following flows are high level to illustrate the behaviour in case of multiple devices

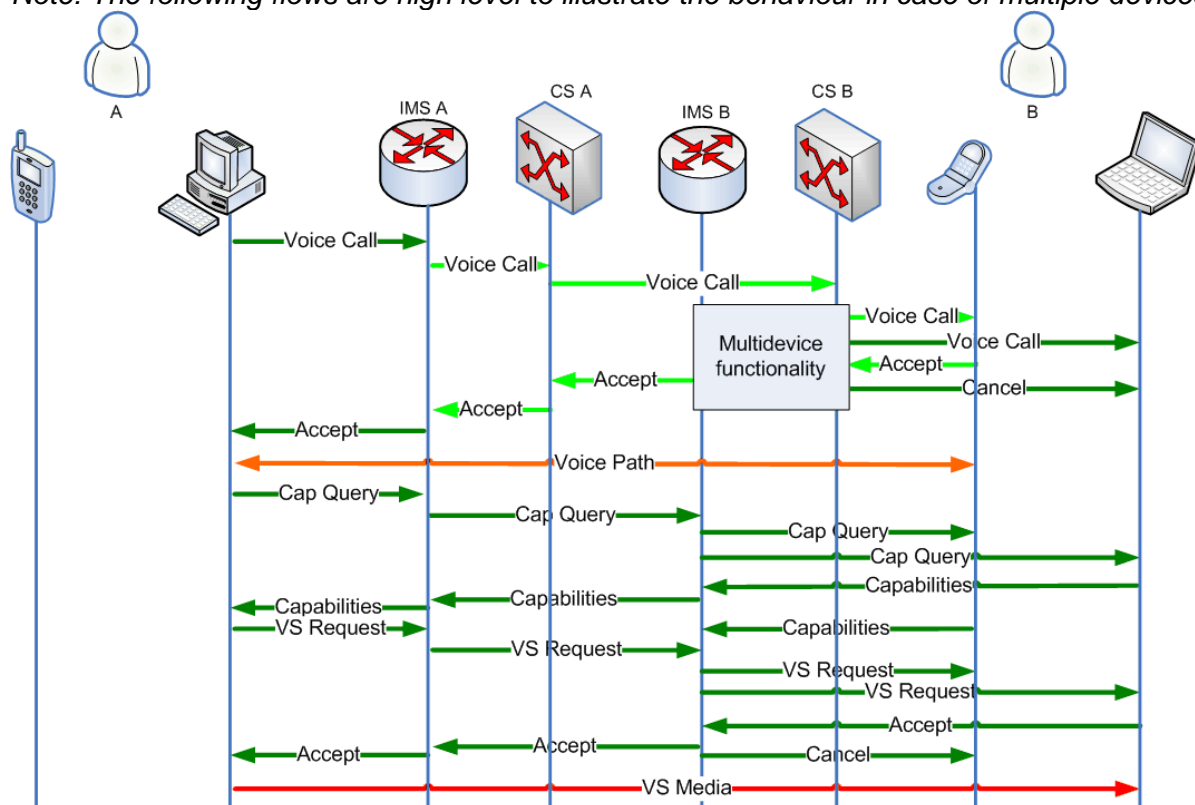


Figure 6: Example multi-device high level flow for voice and video sharing

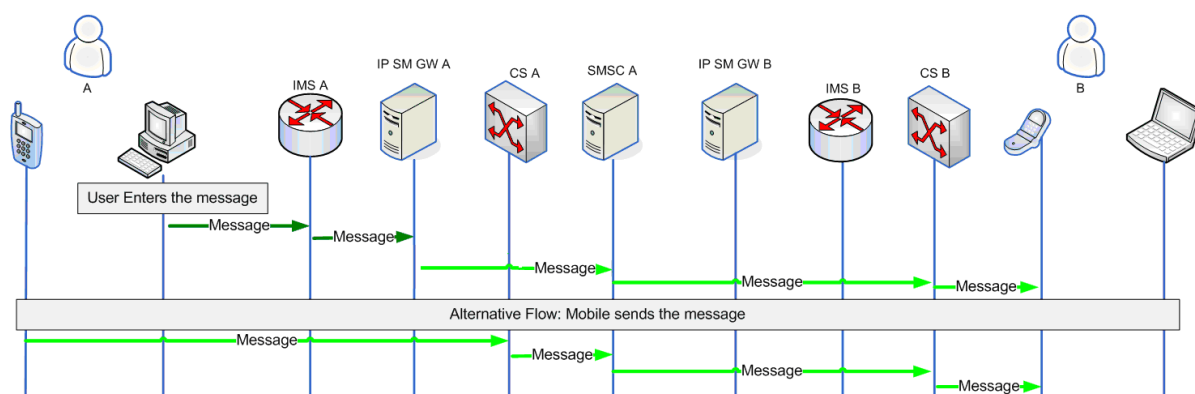
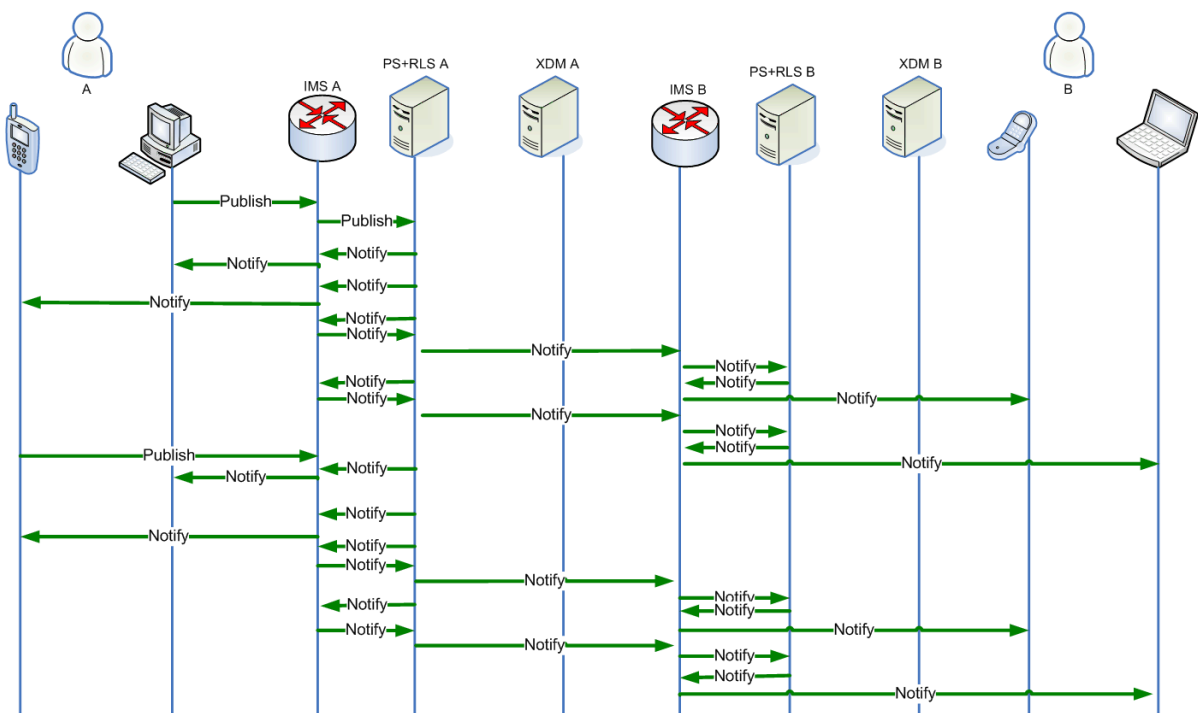
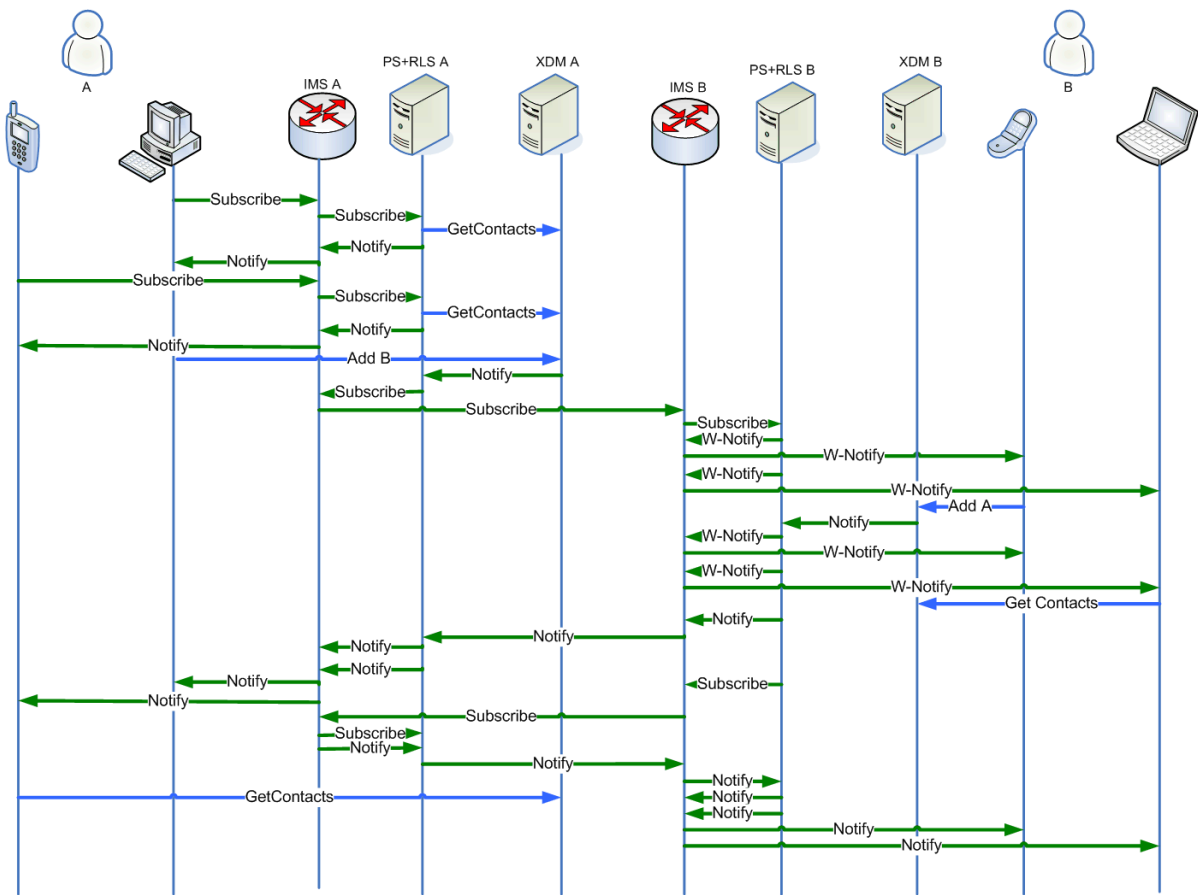


Figure 7: Example multi-device high level flow for messaging (SMS/MMS)







## DOCUMENT MANAGEMENT

### Document History

Version	Date	Brief Description of Change	Approval Authority	Editor Company /
0.1	22 April 2009	First baseline document for Release 2	RCS Programme	Tero Jalkanen / TeliaSonera
0.2	14 May 2009	Update based on RCS TG Antwerp meeting, including CRs: <ul style="list-style-type: none"> <li>• RCS-CR R2_Multi-device_Editorial-2009-TR0001</li> <li>• 2009-TR0004-Presence capability exchange for PS voice-edited</li> <li>• 2009-TR0005-CR-R2 TR ch 3 clarifications-edited</li> <li>• 2009-TR0007 R2 SMSIP clarifications</li> </ul>		
0.3	3 June 2009	Update including CRs: <ul style="list-style-type: none"> <li>• RCS-CR OPTIONS handling-2009-TR0003-R01</li> <li>• 2009-TR0006 R3 Initial chat invite clarifications</li> <li>• 2009-TR0009R1- Updating Address Book Section</li> </ul> In addition a new Changes Compared to Release 1 chapter added, consisting of the following R1 Bug Fix CRs: <ul style="list-style-type: none"> <li>• RCS1-BF0001- UE subscribing to its own Presence-R10</li> <li>• RCS1-BF0016 Initial chat invite using subject header_TR</li> <li>• RCS1 CR Multidevice_options_handling-RCS1-BF0022</li> </ul>		
0.4	11 June 2009	Update after Berg meeting, including CRs: <ul style="list-style-type: none"> <li>• CR_RCS_Permanent_</li> </ul>		

Version	Date	Brief Description of Change	Approval Authority	Editor Company /
		Presence_State_TR001 1R3 <ul style="list-style-type: none"> <li>• BF0012R1- Switching to use of hard State for RCS1 and RCS 2</li> <li>• 2009-TR0012 R1 Correction to messaging chapter in RCS R2 TR</li> <li>• RCS-CR Control_of_service_delivery_handling-2009-TR0013R1</li> <li>• 2009-TR0015R1- Aligning NAB Section in release 2</li> <li>• 2009-TR0016-Updating section 3.3 in Release 2 TR</li> <li>• RCS1-BF0027R1- Updating handling of soft Presence information in R1</li> </ul>		
0.5	22 June 2009	Update after consistency review Review report : SPEC DOC RCS SPEC R2_007 <a href="https://infocentre.gsm.org/cgi-bin/docindex.cgi?33477">https://infocentre.gsm.org/cgi-bin/docindex.cgi?33477</a> Page 2 Added, needed for DAG Approval		Dirk Raeymaekers/NSN
0.6	25 June 2009	Accept changes front pages & grammar/spelling check	RCS Programme	Dirk Raeymaekers/NSN
1.0	31 Aug 2009	DAG & EMC Approval and updated version to 1.0	DAG & EMC	Dirk Raeymaekers/NSN
1.01	25 Nov 2009	Update incorporating CRs: <ul style="list-style-type: none"> <li>• RCS2-BF0001 Improved description for the handling of permanent presence document updates and unexpected notifications</li> </ul>	RCS Programme	Tero Jalkanen / TeliaSonera

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		<ul style="list-style-type: none"> <li>RCS2_BF004R3 Clarification regarding support for wideband speech communication capabilities based on AMR-WB in RCS Release 2</li> <li>RCS2_BF0005 Clarification regarding support for video codec H264/AVC in RCS Release 2 for video share</li> <li>RCS2-BF0007 clarification on chat invitations</li> <li>RCS2-BF0010R1 Clarify use of content sharing feature tags for BA clients</li> </ul>		
1.02	1 Dec 09	Minor update based on TG San Francisco meeting comments	RCS Programme	Tero Jalkanen / TeliaSonera
1.03	11 Dec 09	Update 1.02 (Approved at Plenary 3/12/09) with front pages for DAG approval. No review comments received during consistency review See SPEC DOC RCS SPEC R2_017 in <a href="https://infocentre.gsm.org/cgi-bin/docindex.cgi?33477">https://infocentre.gsm.org/cgi-bin/docindex.cgi?33477</a>	RCS Programme	Dirk Raeymaekers /NSN
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#### Other Information

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