joyn Blackbird Product Definition Document

Version 4.0

06 October 2014

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

Security Classification: Non-confidential

Copyright Notice

Disclaimer

Antitrust Notice

Table of Contents

1   Introduction

1.1   Overview

This document provides guidance to Original Equipment Manufacturers (OEM) and Application Developers on the implementation of the Blackbird (BB) release of joyn. joyn Blackbird is based on RCS 5.0 and 5.1 specifications which include RCS-e 1.2.2, Hot Fixes Implementation Guidelines 3.0 and Hot Fixes UX Guidelines 2.2. The document aims to communicate Mobile Network Operator (MNO) expectations around the implementation of user experience related aspects of joyn.

It is strongly recommended that the implementation of joyn Blackbird is closely integrated with the devices core native communication services. Utilizing the joyn brand to indicate the presence of joyn features within native touch points greatly improves the adoption and recognition of joyn as the next generation of telecommunication services.

1.2   Scope

The document covers native and downloadable application-based implementations of the Blackbird release of joyn, reflecting user requirements gathered during user testing of Legacy devices as well as the next generation of joyn features.

1.2.1   Purpose of the document

The purpose of this document is to detail how the new features included within Blackbird should be implemented and how Blackbird can be backward compatible and interwork with existing in-market Legacy devices.

1.2.2   Structure of the document

The document details how the features are to be implemented in regards to the User Experience (UX) and includes technical specification references and details that may influence how certain functions behave, creating an overall guide for OEMs and application developers.

- Chapter 2 covers discovery and activation of joyn.
- Chapter 3 covers contacts and capability discovery.
- Chapters 4 to 12 detail the 9 major product features of joyn Blackbird release.
- Chapter 13 to 17 address Settings, Blocking, Roaming, Accessibility and joyn states.

1.2.3   joyn client scope

joyn can be delivered in two ways for users:

1. joyn can be implemented natively within the device by the OEM, tightly integrating the joyn capabilities and services within the address book and many other native touch points across the device.
2. joyn can also be implemented as a downloadable application that can be downloaded from Application stores and accessible as a separate application on the user's device, usually within the device's application folder or its desktop.

In most cases implementation of features is identical for both native and downloadable clients and this document for the most part will not differentiate between the two. In those cases where implementation of a feature in a downloadable client differs from the native experience, this may be described separately within the relevant section.

1.2.4   Blackbird Feature List

The Blackbird release of joyn has a strong focus on the native implementation of the communication services, providing a more seamless experience for the user and a simpler user interface.

The following features have been included in this release:

Service	Feature	Details	Section
Provisioning	Activation of Service	There are now further options for joyn activation in the user's device to support multiple bearers and scenarios including Wi-Fi and IMSI based registration.	2
Device Support	Multi Device Support	The specification details the use cases for secondary device activation and how Blackbird services will behave in multi device environments including scenarios that pertain to backward compatibility with legacy devices.	All Chapters
Messaging	Integrated Messaging	Integration of joyn messaging with existing messaging functionality	4
Chat	One to one	More emoticons – Inclusion of Unicode standard support at device level	18
		Backward Compatibility with legacy devices	All Chapters
Chat	Group	More emoticons – Inclusion of Unicode standard support at device level	18
		Backward Compatibility with legacy device	All Chapters
Share	File Transfer	Store and Forward	7
		Group Chat File Transfer	7.2
		Thumbnail preview for Image and Video sharing	7.1.1
Calling	Total Call Services	Orientation correction	10.1.7
		Chat within call	5.2.2

: Blackbird feature list

1.3   Requirement Classification

Term	Description
Shall/*Will*	These terms dictate that a functionality and/or process is **Mandatory**
Must/*Must* Not	These terms dictate that a functionality and/or process is **Mandatory**
Required	These terms dictate that a functionality and/or process is **Mandatory**
Should/*Should* Not	This term dictates that the functionality and or/process is **Highly *Recommended***
Recommended	This term dictates that the functionality and or/process is **Highly *Recommended***
May	This term dictates that the functionality and or/process is **Nice to Have**
Optional	This term dictates that the functionality and or/process is **Nice to Have**

: Requirements Classification

1.4   Definitions and Abbreviations

Table 2

Term	Description
'About Phone' section	Usually a service menu item on devices describing device and software release details.
3G	Third generation mobile cellular technology for networks based on the GSM standard.
3rd party communication applications	Communication services provided by parties other than the MNO. Third party services might be offered by the device manufacturer or over-the-top as a web-based service.
AA	Auto Accept, used in File Transfer
AB	Address Book, the user phone book on the device.
Active Chat Dialogue	A Chat thread with a contact or group of contacts stored in the communication history.
Active Voice Call	An on-going voice call.
Activity Log	A log file where all communication events are registered. This log file might be designed as general log and/or person-centric log. It is OEM dependent.
A-Party	Calling party/sender.
Available	A capable joyn user, connected to the data network, registered and connected to joyn services, but not necessarily active
Blacklist	List of contacts or manually entered telephone numbers that are excluded from Joyn communication by the user.
Block a contact	User-managed block use of service and display of communication events of a user's specific contact. A contact might be defined as an address book entry or a manually inserted telephone number.
B-Party	Called party/receiver.
Bug Fix Update	A device software update provided by the MNO over-the-air to fix known bugs.
Call Application	The application that is active while dialling or within an active voice call,

Term	Description
	providing functions to control mute, loudspeaker mode, extend the call to a conference call etc.
Called Party	The party who receives a call.
Calling Party	The party who initiates a call.
Capability Discovery	The process that enables a user to understand the subset of joyn services available to access and/or communicate with his/her contacts at a certain point in time. The capability discovery is the RCS-e service backbone. It runs in the background without user visibility.
Capability Exchange	Background process to exchange service capabilities via telecommunications signalling.
Capable	Capable refers to either the device or the user. A capable device is an accredited device or application. A capable user is a user on an accredited joyn network with an accredited device or application and provisioned for joyn services.
Changing Phone	Insert a legacy SIM card (previously registered and used SIM card) into a new device.
Chat	Instant Message Service - a form of real-time direct text-based Chatting communication in push mode between two or more people over a network.
Chat conversation	A thread of instant messages exchanged with one contact or a group of contacts.
Chat Thread	An Instant Message conversation history. The Chat thread usually contains all messages, notifications and events exchanged between two or more people listed in chronological order.
Communication history	Summary of all communication events (voice calls, Wi-Fi Voice, Video over IP, SMS, IM, file transfers). The communication history might be presented as a complete summary of all own communication events or filtered by communication partners (person centric view).
Connected	Synonym for available (see above)
Connectivity status	Connectivity status refers to the status of a user's device with respect to connecting to the data network and joyn services
Contact Detail Page	Detail view within the user address book showing all attributes of a specific contact record.
Contact group	A list of contacts defined under a specific group name.
Content Share	The action of sharing an image or any other file over a voice call.
Core communication services	Standard communication services globally available in mobile networks: voice, SMS, MMS.
Cross-OEM	Definitions and agreements applicable across several handset manufacturers.
CS	Circuit-switched call
CSS	Content Share Service (Video/Image Share).
Customer journey	Sum of all experiences a customer has with a supplier of goods or services, over the duration of their relationship with that supplier. From

Term	Description
	awareness, discovery, attraction, interaction, purchase, use, cultivation and advocacy.
Device Configuration	The device configuration provides a joyn device or client with the necessary parameters over-the-air to operate within a specific Joyn network.
Device Platform	Categorisation of mobile operating systems (mobile OS); the system that controls a smartphone, tablet, PDA, or other mobile device.
Dialler	Initial user interface (UI) when entering the call application directly. Allows dialling a phone number manually or access to phone book, communication history or favourites.
File browser	A device application that allows the user to list and access files within the devices folder structure.
File Transfer	Transfer a file from sender to receiver and store the file in the receiver's file folder.
File Transfer Acceptance Dialogue	Before the File Transfer is initiated the receiver is requested to accept the file.
FT	File Transfer service
Group Chat	A Chat session with multiple participants.
Hard key menu	Some devices/operating systems support a specific device hard key to open a context sensitive menu.
Idle screen/locked screen	Display shown if the device is not in use and in idle mode. Usually a screen saver or a home screen.
IM	Instant Messaging – Chat service.
IM window	The Chat main screen – usually the Chat inbox/thread with message composer.
IMS	IP multimedia subsystem
IMSI	International mobile subscriber identity
In Call Screen	UI display during call or at call set-up.
IP	Internet protocol
joyn	The service mark for joyn services owned by the GSMA.
Joyn Capabilities	Service capabilities reported by a joyn device to answer a capability request. Within RCS-e V1.2 the following service capabilities are reported: Chat, File Transfer, Video Share, and Image Share.
joyn Capable Contact List	A filtered list of contacts showing those who are identified as Joyn contacts.
joyn Filtered Contact List	A filtered list of contacts which shows only joyn enabled contacts.
joyn instance switch	Control element to switch off a joyn instance (native or downloaded) when the user would like to initiate another joyn instance on the same device. All joyn UI elements and functions of the deactivated instance should be greyed out.
joyn logo	joyn service mark registered and owned by the GSMA. OEMs and vendors can accredit to use the joyn logo within their products.

Term	Description
joyn network	A mobile network supporting joyn handsets in registration and use of joyn services.
joyn notifications	joyn notifications alerting joyn communication events. joyn notifications are differentiated from standard notifications by the use of the joyn service icon.
joyn Service Indicator	A symbol or icon that shows that the joyn service is up and running on the device.
joyn set-up	This refers to the set-up icon which triggers service activation
KB	Kilobyte
Legacy Network/Device	A network or device following RCS-e 1.2.2 r specification, joyn Hot Fixes Technical Implementation Guidelines 3.0 and joyn Hot Fixes UX Guidelines 2.2 (which together form the Hot Fixes PDD)
Legacy SIM	A SIM card that has already been in use.
LTE	Long Term Evolution
Main Device	This is the device where all, or the most, joyn features are active across the user's primary and secondary devices. It is determined by the network.
Maintenance Release Upgrade	A software update to fix bugs or issues detected with the installed software base. Maintenance release upgrades are usually run over-the-air.
Media Gallery	A folder within the device's file directory providing music, image, or video objects. The objects are usually presented with preview (thumbnail) features to simplify selection by the user.
MiFi	A wireless router that acts as a mobile Wi-Fi hotspot
MMS	Multimedia message service
MNO	Mobile network operator
MO	Managed object
MPEG	Moving pictures experts group
Ms	Milliseconds
MSISDN	Mobile subscriber integrated services digital network number
MSRP	Message session relay protocol
MTU	Maximum transmission unit
Native address book	The address book that is deeply integrated into the device operating system.
Network Coverage	The geographic area where the device has radio connectivity to the mobile network.
Notification	Delivery of a message to a receiver with the intention to get the user's attention.
Notification bar	A specific section on the device display to indicate service events.
Notification tray	A specific communication channel to handle notifications.
OEM	Original Equipment Manufacturer

Term	Description
OEM UI guidelines	OEM's internal guidelines on how to design user interfaces (UIs) for mobile devices.
OMA	Open Mobile Alliance
Online	Synonym for available (see above)
Operating System	An operating system (OS) is a set of programs that manages a device's resources and provide common services for application software. The operating system is the most important type of system software in a computerised device. A user cannot run an application program on the device without an operating system.
OS	Operating System – see above.
OTA	Over-the-air
OTP	One Time Password
Overlay	An UI element put at the top layer of a display.
PC	Personal computer.
Primary Device	The device containing the SIM which is used as the primary identity
Primary Identity	This is the identity a joyn blackbird user uses to access joyn across primary and secondary devices. It is typically their MSISDN.
Provisioned Users	A user who is allowed to use the service. The business support system provides the appropriate permission.
PS	Packet Switched
QoS	Quality of Service
RCS-e	Rich Communication Suite – enhanced
RCS-e Specification	GSMA specification RCS-e - Advanced Communications: Services and Client Specification Version 1.2.1 16 December 2011.
SBC	Session Border Controller
S&F	Store & Forward
Secondary Device	Any additional device used to access joyn with the primary identity.
Self-Care	Personal service maintenance with the intention of improving or restoring service functionality or to answer service-related questions.
Service Entry Points	Touch point to start the use of a service.
Service Workflow	The service workflow consists of a sequence of connected steps. Emphasis is on the flow paradigm, where each step follows the precedent without delay or gap and ends just before the subsequent step may begin.
Shadow message	Tool tip, hint to the user highlighted when focus is on UI element and disappears on user activity.
Share Touch Point	UI element that enables media sharing applications.
SIP	Session Initiation Protocol
SMIL	Synchronized Multimedia Integration Language
SMS	Short Message Service

Term	Description
Software Update	A partial or total replacement of a previously installed software pack. A software update is usually designed to fix problems with, or extend/enhance a mobile device application and/or its supporting data.
Status bar	An information area typically found at the top of mobile graphical UIs. A status bar is sometimes divided into sections, each showing different information such as coverage, battery status and service notifications. Its job is primarily to display information about the current state of the mobile device and the user's services.
Suggested	Recommendation that the MNO follows the advice given based on experience and customer feedback. There might be good reasons for an OEM not to follow the advice.
T&C	Terms and Conditions; any provision forming part of a contract that allows a user access to joyn services. Each term gives rise to a contractual obligation, breach of which can result in the withdrawal of the right to use the service, and may give rise to litigation.
The network	All system elements involved in the end-to-end transaction between sender and receiver which do not belong to the user's device.
Touch Point	Relevant contact points with users before, during and after a joyn service interaction.
UAC	User Agent Client
UI	User Interface – see below
Unblock a contact	Permanently release the blocking of a specific contact by the user.
Unified blocking mechanism	Blocking of a contact will block all incoming communications from that contact.
Use Case	Describes the situation where specific elements and participants (users, systems) act to achieve an intended result.
UE	User Equipment
User Interface (UI)	The user interface (UI) is the space where interaction between humans and devices occurs. The goal is to achieve effective operation and control of the device, and collect feedback from the device to help the user in making operational decisions. The UI can be implemented as any combination of graphical, acoustic, or haptic elements.
User-Generated Content	All communication content that is generated by using joyn services. For example, Chat sessions, Chat history, Chat messages, File Transfer logs, Video Sharing history.
UX	User Experience
Vanilla	In this document: a software configuration without any joyn functions or joyn UI elements. No joyn touch-points are given on a vanilla device.
Video and Image Share	Sending a video or an image to the communication partner during a call. The video/image sent will be presented on the sender's as well as on the receiver's display.
Video Call	Bi-directional video communication with lip synchronous audio
Video Gallery	A folder within the device's file directory where videos are stored.

Term	Description
xMS	Generic term covering all messaging services i.e. SMS and MMS.

1.5   References

Ref	Doc Number	Title
[1]	[RCC.07 RCS 5.1]	RCC.07 RCS 5.1 v2.0 Advanced Communications: Services and Clients specification
[2]	[RFC 2119]	"Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997. Available at http://www.ietf.org/rfc/rfc2119.txt
[3]	[RFC 3326]	"The Reason Header Field for the Session Initiation Protocol (SIP)", H. Schulzrinne, D. Oran, G. Camarillo, December 2002. Available at http://www.ietf.org/rfc/rfc3326.txt
[4]	[Digiguide]	Reference to be confirmed
[5]	[PRD IR.74]	IR.74.1.4 - Video Share Interoperability Specification http://www.gsma.com/newsroom/ir-74-1-4-video-share-interoperability-specification
[6]	[RFC 3840]	"Indicating User Agent Capabilities in the Session Initiation Protocol (SIP)", J. Rosenberg, H. Schulzrinne, P. Kyzivat, August 2004. http://www.ietf.org/rfc/rfc3840.txt
[7]	[Hot Fixes]	User Experience Guidelines: http://www.gsma.com/rcs/v1-2-joyn-hot-fixes-user-experience-guidance/ Implementation Guidelines: http://www.gsma.com/rcs/wp-content/uploads/2012/12/RCS-e_Implementation_guidelines_v3_2_clean.pdf RCS-e 1.2.2: http://www.gsma.com/rcs/wp-content/uploads/2012/03/rcs-e_advanced_comms_specification_v1_2_2_approved.pdf
[8]	[RCS5SIMPLEIMENDORS]	GSMA RCS 5.1 Endorsement of OMA SIP/SIMPLE IM 1.0, Version 1.0 13 August 2012 http://www.gsma.com/rcs/wp-content/uploads/2012/10/RCS5.1-UNI-V1.0.zip
[9]	[RFC 4575]	A Session Initiation Protocol (SIP) Event Package for Conference State, IETF RFC http://tools.ietf.org/html/rfc4575

2   Discovery and Activation of joyn

2.1   Native device out of the box experience

2.1.1   First device start-up

Due to the configurability of the experience in joyn Blackbird, the joyn Hotfixes requirement for a welcome wizard at first device start-up results are no-longer feasible and is therefore removed. The need for informing the user about the enhanced set of services their device is providing is however still valid. Guidelines on how to present this information in a more contextualised manner will be provided in future editions of the standard.

2.1.2   Operating System update or Maintenance release update

This use case describes the scenario where the user sees their device becoming joyn capable after an operating system update or maintenance release upgrade that introduces new or updated joyn capabilities into an existing device.

The behaviour post update *should* match the steps described for discovery and service activation, as if the user had just bought a new device, from the welcome wizard, to the moment when the user has become a joyn user.

Where an existing implementation of joyn is being updated, as the Blackbird version of joyn does not contemplate server side storage of user data, it is critical that all existing user-generated content within the joyn services (i.e. Chat sessions, Chat history, Chat messages, File Transfer logs, Video Sharing history) and the list of joyn enabled contacts be preserved during and after the update process.

2.1.3   Removal of content from previous joyn account

When a new SIM card is inserted into an already configured handset, joyn activity logs and previously transferred content within joyn services *will* follow the same policy as other data from the device such as photos, videos, SMS, and address book, as defined by the OEM.

Where the OEM policy is to delete pre-existing SIM-related data when a new SIM is inserted, the device *should* inform the new user before deleting the old content.

2.2   Downloadable applications

joyn in online markets
joyn is expected to be available for download in the most popular online markets. Several versions of the downloadable application *may* coexist in a market, such as the following:

- A cross-operator version of the downloadable application that is shared by two or more operators in a country.
- A MNO specific application that *may* bring additional MNO specific functionality.

Each of these applications shall allow service activation in the same way that applies for native clients.

Downloadable applications *may* include a tutorial to help users understand how to use joyn. A start-up wizard is not mandatory for downloadable applications.

2.3   Service Activation

The joyn service is to be activated seamlessly and interaction with the customer during set up shall be minimised. The user *will* perceive that joyn is working out of the box, no registration is required and the service *shall* be automatically activated wherever network T&Cs allow.

joyn *will* most likely be activated in one of the following scenarios:

- As part of the initial phone setup, when joyn is natively implemented in a device.
- Just after downloading the joyn application from any online market to any kind of device.

Activation *may* happen over cellular or non-cellular networks.

2.3.1   Configuration of the user's primary device with seamless identification of the user

When the user activates joyn over a cellular network that implements MSISDN Header enrichment, provisioning of the service and configuration of the device is done automatically in the background without any user interaction as the identity is seamlessly provided by the cellular network.

In some cases, when the user cannot be authenticated based on the cellular access, obtaining the MSISDN from the IMSI *may* be possible enabling an automatic provisioning process. No user action is required. Not all the networks (intended as Mobile Carriers) will support this method, for instance, those providing multi-SIM services where the identification is by IMSI *may* fail.

In any case, where the network hasn't been able to identify the user automatically, the network *will* return an error as described in section 2.3.5 which will not be visible to the user and the device *will* enter into the process described in section 2.3.2, which describes the configuration of the user´s device by requesting the identity of the user

2.3.1.1 Error Management

The user may get any of the following errors:

- Temporary: Applies to internal errors during configuration/provisioning or configuration server unreachable, as specified in section 2.3.3.2.4 of [RCC.07 RCS 5.1] specs. The device shall reattempt provisioning at a later stage (i.e. at the next device start-up)
- Permanent: In case of invalid requests the user is informed that he cannot use the MSISDN, the device displays the error message provided by the network.

2.3.2   Configuration of the user´s primary device by requesting user identity

When automatic identification of the user is not possible, the user shall be prompted to type in their MSISDN. To do so a pop-up as shown in figure 1 *will be displayed*. In order to prove

the user has been allocated the number he typed in, a silent SMS with a password is sent back to the device. This SMS has to be intercepted by the application that completes the provisioning process without any further user interaction.

Figure 1 **: Pop-up requesting the user's MSISDN**

2.3.2.1 Error management

The following scenarios *may* occur:

Receipt of SMS
If the SMS takes too long or is never received, there are two possible causes:

- The network does not deliver the SMS for whatever reason.
- The user made a mistake when typing the MSISDN and the SMS is sent to a different device.

In either case, the user is presented with a screen informing him that the process is taking longer than expected. This screen contains a text box with the previously given MSISDN (so that the user can amend it if necessary) and a 'retry' button. This procedure can be attempted a maximum of ten times after which joyn is deactivated.

Network Failure

Please refer to 2.3.1.1. Such errors may also occur after receiving the SMS with the password.

2.3.3   User consent

Some markets require users to accept a new set of Terms & Conditions (T&C) for joyn. This process is entirely controlled by the network based on messages as described in the technical realisation section (see 2.3.5).

The presentation of the messages *must* be clear to the user and not hidden within the notification tray for action, but be presented 'on top' of the screen (see Figure 2).

: Example Terms & Conditions pop-up

Figure 2

If the user accepts the T&Cs, joyn can be used in the device.

At least the joyn set-up may remain visible in the device apps desktop if the T&Cs have been rejected. As described in section 2.3.5.1.3, the process for this shall depend on the mechanism used for relaying the T&Cs to the device. For further information see joyn States 13. Accessing this joyn set-up icon later will again trigger the service activation and T&C acceptance process if joyn is active for that MNO. User´s T&C acceptance *may* be tracked at network level, i.e. the network *may* be aware of this acceptance or rejection to allow further actions like active service promotion to those users that didn´t accept T&C.

When a customer has accepted and been provisioned for joyn, a welcome message *can* be displayed. This *should* be done using End User Confirmation Request i.e. triggered by the network.

If an MNO does not require users to accept T&Cs, it *may* still use a pop-up message to welcome users or provide any specific information regarding joyn. This message *may* be directly popped-up on the screen, not hidden in the notification tray, but should feature a single button to proceed (i.e. a "decline" option is not presented; recommended labels for the button are 'next', 'accept' or 'OK'*)*.

2.3.4   Dual Mode Service Activation

If during the service activation process the network declares not to be Blackbird compliant but to be a Legacy network, the Blackbird device will be activated in Legacy mode. This means that Blackbird devices shall be able to work in dual mode and behave like a Legacy device when the network is not Blackbird ready. See Table 3 for scenarios.

| Network-device scenarios | | Device behaviour | |
A party	B party	Device A party acts as	Device B party acts as
BB device-BB network	BB device-BB network	BB	BB
BB device- Legacy network	BB device-BB network	Legacy	BB (Legacy features)
Legacy device-BB network	BB device-BB network	Legacy	BB (Legacy features)
Legacy device- Legacy network	BB device-BB network	Legacy	BB (Legacy features)
BB device-BB network	BB device- Legacy network	BB (Legacy features)	Legacy
BB device- Legacy network	BB device- Legacy network	Legacy	Legacy
Legacy device-BB network	BB device- Legacy network	Legacy	Legacy
Legacy device- Legacy network	BB device- Legacy network	Legacy	Legacy
BB device-BB network	Legacy device-BB network	BB (Legacy features)	Legacy
BB device- Legacy network	Legacy device-BB network	Legacy	Legacy
Legacy device-BB network	Legacy device-BB network	Legacy	Legacy
Legacy device- Legacy network	Legacy device-BB network	Legacy	Legacy
BB device-BB network	Legacy device- Legacy network	BB (Legacy features)	Legacy
BB device- Legacy network	Legacy device- Legacy network	Legacy	Legacy
Legacy device-BB network	Legacy device- Legacy network	Legacy	Legacy
Legacy device- Legacy network	Legacy device- Legacy network	Legacy	Legacy

: Device behaviour in network and device scenarios

A Blackbird device operating as A party within a Blackbird network perceives no changes to their own joyn Blackbird functionality when communicating with a Legacy device, but the capabilities of that contact are restricted to Legacy functionality.

A Blackbird device acting as Legacy device complies with the following requirements irrespective of the other party's device type (as a result of what is defined in section 2.3.5.3.2):

- Supports Legacy device features.
- Is configured as a Legacy device.
- Supports capability discovery with reference only to Legacy capabilities.
- Capability discovery ignores new Blackbird capabilities (e.g. does not present them in address book).

The following exceptions to the rules above apply:
- User Experience (UX)/User Interface (UI) modifications to Legacy features remain in place (e.g. the joyn setup icon may be visible or the device wizard may contain a section about joyn).
- Network initiated configuration request via SMS remains supported (especially for open market variants).

A Legacy device in a Blackbird network *shall*:

- Be able to correctly manage a Blackbird configuration.
- Ignore new Blackbird capabilities in capability discovery.
- Comply with the requirements stated throughout this document.

2.3.5   Technical Implementation

2.3.5.1 Specification References

2.3.5.1.1   Configuration over cellular networks

The configuration over cellular networks *shall* be done as described in [RCC.07 RCS 5.1] section 2.3.3.1 and 2.3.3.2 with only the Hyper Text Transfer Protocol (HTTP) solution being in scope for joyn Blackbird as it is also needed when configuring over non-cellular networks (see section 2.3.5.1.2). For the HTTP based mechanism, section 2.3.3.2 of [RCC.07 RCS 5.1] and its subsections *shall* apply in their entirety. If the network cannot authorize the user (as described in section 2.3.1) an HTTP 511 Response will be returned as indicated in section 2.3.3.2.4 of [RCC.07 RCS 5.1], which will (as indicated in [RCC.07 RCS 5.1]) result in the use of the procedures in section 2.3.3.3 of [RCC.07 RCS 5.1]. In that case if the IMSI is available (as described in section 2.3.1), a device implementing joyn Blackbird *shall* not ask the user for the MSISDN, and shall instead attempt the configuration providing only the IMSI in the HTTP request

The error scenarios described in section 2.3.1 correspond to those in section 2.3.3.3.3 of [RCC.07 RCS 5.1] where a HTTP 403 FORBIDDEN response *shall* be interpreted as a permanent error and any other error response including HTTP 511 NETWORK AUTHENTICATION *REQUIRED* as a temporary one. HTTP 511 NETWORK AUTHENTICATION *REQUIRED shall* trigger the manual configuration process described in section 2.3.2. A permanent error may also be signalled through a HTTP 200 OK response including a body indicating that the client should be disabled (i.e. version and validity set to -

1). In this case, the network may include a message for the user as described in section 2.3.3.2.3 of [RCC.07 RCS 5.1].

2.3.5.1.2   Configuration over non-cellular networks

Configuration over non-cellular networks *shall* be realised using the HTTP mechanism as described in section 2.3.3.3 of [RCC.07 RCS 5.1] and its subsections. The device *shall* assume that joyn is available on the user's network if DNS resolution of the HTTP configuration URL is possible using the MCC and MNC obtained from the SIM card. Like for non-cellular configuration, if the IMSI is available (as in the case described in section 2.3.1**Error! Reference source not found.**), a device implementing joyn Blackbird *shall* not ask the user for the MSISDN, and shall instead attempt the configuration providing only the IMSI.

2.3.5.1.3   User Consent

A Service Provider has two options to realize the user consent behaviour described in section 2.3.3:

1. If the user's acceptance/rejection of the Terms and Conditions is not *required* to be known explicitly in the network, the Service Provider *may* use the mechanism for providing User Messages in the HTTP configuration described in section 2.3.3.2.3 of [RCC.07 RCS 5.1].
   In the network, the user's acceptance of the conditions can then be derived implicitly when the device registers for the first time.
2. If the user's response to the Terms and Conditions needs to be known in the network, the Service Provider can rely on the End User Confirmation Request mechanism described in section 2.10 of [RCC.07 RCS 5.1]. No specific handling apart from the normal processing of End User Confirmation Requests is thus assumed to be provided on the device. In this case the network could disable the joyn client by triggering a client reconfiguration using the procedure defined in section 2.5 and returning a HTTP configuration response with version and validity set to '–2' ensuring that the joyn touch points remain available as described in section 2.3.3.2.2 of [RCC.07 RCS 5.1].

   NOTE: End User Confirmation Requests could be used to provide a Welcome message. If there is no need to provide T&C also the User Message in the HTTP configuration can be used for that purpose.

2.3.5.2   Configuration Parameters

The configuration parameters *will* be stored as described in section 2.3.4 of [RCC.07 RCS 5.1]. For joyn Blackbird a full configuration document containing all parameters described in Annex A of [RCC.07 RCS 5.1] *shall* be provided to the clients. As not all parameters are used, some *will* have a fixed value. Details are provided in the respective sections on the services.

   NOTE: The use of other values for configuration parameters with a fixed value potentially resulting in the inclusion of other configuration parameters that as a result become mandatory or relevant according to [RCC.07 RCS 5.1] is

out of scope for this specification, but may happen in Service Provider specific implementations of joyn Blackbird.

2.3.5.3 joyn Blackbird Specific Technical Behaviour

NOTE: Functionality in this section is considered applicable only for the joyn User Experience and is therefore not reflected in RCS 5.1

2.3.5.3.1 joyn client identification

For joyn Blackbird the rcs_profile parameter shall be included in the HTTP GET requests and set to "joyn_blackbird".

2.3.5.3.2 Configuration Document formatting

When connecting to a legacy network, a joyn Blackbird client may receive a non-Blackbird configuration document that does not contain certain configuration parameters that are defined for joyn Blackbird and that for some other parameters (most notably the ones controlling the enabling/disabling of specific services) carries those parameters in a different location. This is indicated in the different sub sections in this document that describe the configuration parameters. If a parameter is not provided a sensible default behaviour is to be provided that takes into account these circumstances.

Documents from legacy networks can also include unknown parameters. Those shall be ignored.

2.3.5.4 Implementation Guidelines

2.3.5.4.1 Whitelisting (Clarification)

In order to be able to support a white list procedure in the HTTP configuration to only allow the joyn certified clients, the format of the client_version has been defined in [RCC.07 RCS 5.1] and *shall* be sent accordingly by the clients.

The white list procedure, if the Service Provider decides to implement it, will be triggered when a client request a HTTP configuration. The HTTP configuration server will check if the client_vendor and Platform and VersionMajor parts of the client_version match one of the certified clients in the white list and also check that the VersionMinor is bigger than the one in the whitelist.

This will allow the OEMs to increase the VersionMinor part without notifying the GSMA or the Operators.

2.3.5.4.2 Configuration without MSISDN (Clarification)

In case the network does not support the use case where the IMSI is provided without the MSISDN, the HTTP configuration server *will* reject the configuration request with a HTTP 403 FORBIDDEN response as described in section 2.3.3.3.3 of [RCC.07 RCS 5.1] in which case the device *shall* request the user to enter their MSISDN. This leads to following flows;
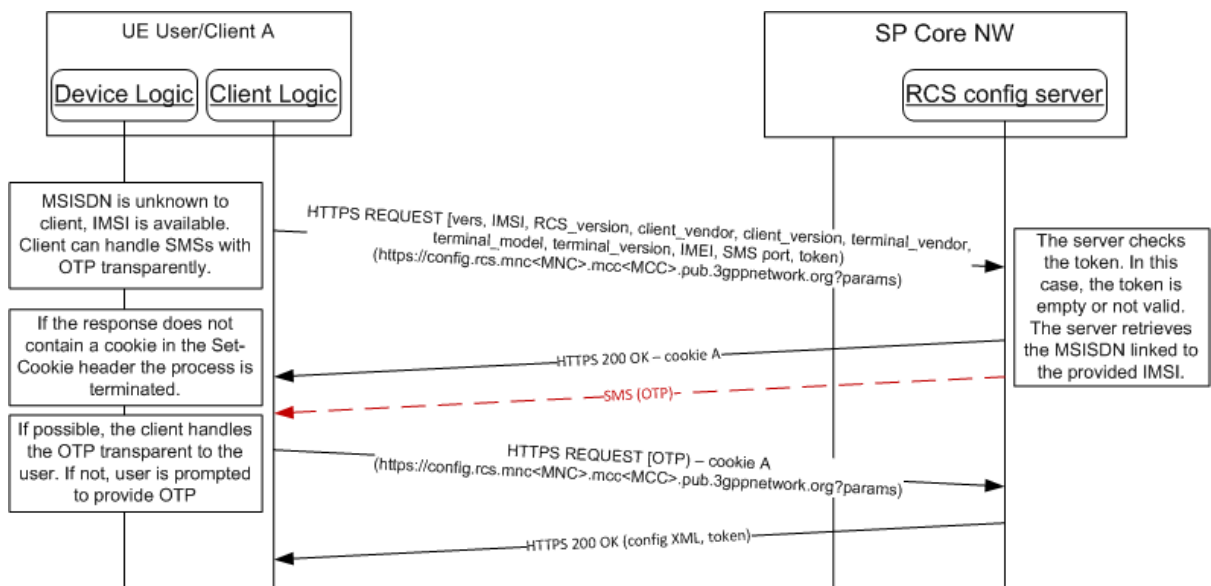
Figure 3: **Successful IMSI-Based configuration of primary devices over non-cellular networks**
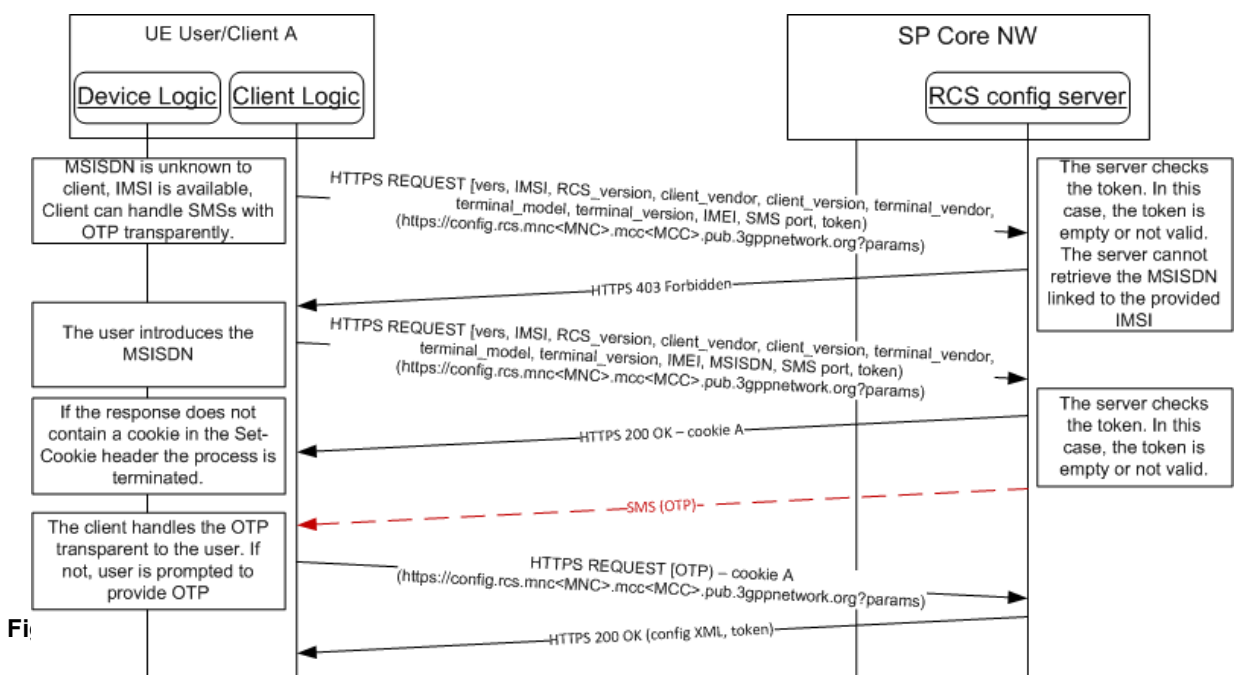
Figure: **IMSI-Based configuration of primary devices over non-cellular networks not supported**

2.3.5.4.3   Normalization of the MSISDN (Clarification)

The MSISDN provided to the network in the configuration request *shall* be in international format starting with '+'.

2.3.5.4.4   Configuration over Wi-Fi and header enrichment (Clarification)

When connecting over a Wi-Fi network that routes to a packet switched (PS) network (e.g. a wireless router acting as a mobile Wi-Fi hotspot (MiFi router), tethering over a smartphone,

etc.), the network may apply header enrichment for the HTTP requests towards the auto-configuration server. Those headers can contain the identity associated to the SIM card in the device providing the PS access rather than the identity of the device that initiated the request on the Wi-Fi network. To address this, a joyn client has to be aware that it is initiating the configuration over Wi-Fi and shall therefore as described in section 2.3.3.3.1 of [RCC.07 RCS 5.1] avoid sending an initial HTTP request. This avoids that incorrect header enrichment is applied.

2.4   Multiple Devices

Primary Identity: A Blackbird user may access joyn from several devices that share the same user´s identity. Thus, an identity that is shared across multiple devices becomes the user´s primary identity and allows using joyn from mobile phones, tablets, and other devices such as PCs at the same time.

Primary device: The device that has the SIM that is used as the primary identity.

Secondary device: Any additional device used to access joyn with the primary identity. It may have a SIM in it. If so, the SIM is ignored as the primary identity is used for secondary devices.

Main Device: Some of the features that Blackbird brings can only work on one device at a time due to certain service limitations. In those cases where a user has more than one device sharing the same identity for joyn, the network will determine which device has all features active (main device) and disable those features, where service limitations apply, in the second and subsequent devices. Further information about these limitations with regards to available features is provided throughout this document when applicable, e.g. Group Chat.

The main device of the user is therefore the only one with all functionality activated, regardless of the fact of being a primary or secondary device. Consequently, a user may have joyn enabled only on a secondary device; however this secondary device acts as the main device, enjoying all joyn features on that secondary device.

All alternative devices may have certain joyn features disabled. Those features that cannot be supported on a second or subsequent device will be disabled by the network at the moment the device receives its configuration. It is therefore during the provisioning process that a device is informed which functionality shall be activated or deactivated.

2.4.1   Configuration of additional devices sharing the same identity

The only way in Blackbird to get multiple devices[1] is by installing a specific application (replacing native joyn, if any, on a native device) that requests the identity of the user, therefore ignoring the SIM (if any SIM is available on the device in which the application runs). This way the user determines the joyn identity to be used by the application, thus allowing them to provide any valid MSISDN.

---

[1] Any device for which there is a compatible application may become a secondary device. It is the responsibility of the MNOs to deliver this kind of application for any device, even for native joyn devices if desired.

When a user wants to use their primary identity in a second or subsequent device, they shall follow a three step authentication process:

1. Identify country and operator: If the application is to be shared by several operators, it will request the user to choose among the available options. As an alternative, the application could be operator and country specific, therefore not needing to request this information
2. Provide user´s primary identity: The user types-in a valid MSISDN as illustrated in Figure 5.
3. Validate primary identity: The user shall prove they own the given primary identity. In order to prove it to be valid a password *shall* be sent over SMS to the user´s primary device. Then the user is requested to enter the password in the application to complete the provisioning process.

Since the SMS with the password is sent in this case to the primary device but the device to be configured may be a different one, the application on the secondary cannot intercept the SMS. Therefore this SMS is readable and the user *will* be requested to go to his inbox, get the password and type it in to complete the provisioning.

: Authentication of secondary devices

2.4.1.1 Error management:

Cases described in section 2.3.2.1 are also valid in this scenario. Additionally, since the user manually types the password, there is a chance of making a mistake and sending a wrong password. If that happens the proposed UX is to display again the text box requesting the password so that the user can retry.

2.4.2   Technical Implementation

2.4.2.1   Specification References

Configuration of secondary devices *shall* be done as described in section 2.3.3.4 of [RCC.07 RCS 5.1]. The scenarios using End User Confirmation Requests described in sections 2.3.3.4.2.2 and 2.3.3.4.2.3 of [RCC.07 RCS 5.1] are not applicable for joyn Blackbird.

2.4.2.2   Configuration Parameters

Storage of configuration parameters on secondary devices *shall* be done in the same way as storage on the main device (see section 2.3.5.2). Also in this case, a complete set of provisioning parameters according to [RCC.07 RCS 5.1] *shall* be provided with some of the parameters having fixed values for Blackbird.

2.4.2.3   joyn Blackbird specific technical behaviour

For joyn Blackbird the rcs_profile parameter shall be included in the HTTP GET requests and set to "joyn_blackbird".

2.5   Provisioning push

2.5.1   Network initiated configuration request

Provisioning push *will* allow a MNO to force the reconfiguration of each user´s device if needed:

- When the MNO makes changes regarding the service settings: e.g. feature settings (Maximum size of File transfers allowed, Auto-accept for file transfer ON/OFF) or making a new service available (Wi-Fi Voice enabled by the MNO),
- When the MNO upgrades the network to a later joyn release: A Blackbird device *may* behave as a Legacy device if the network is not yet Blackbird compliant. Once the network is upgraded, the ability to force a new configuration *will* improve the service as the device *will* start behaving as a 'latest version' device and therefore additional features *may* be offered.
- When the joyn client on a device is inactive (i.e. has run through all available provisioning attempts without succeeding) and the MNO decides to re-activate joyn on the device.

2.5.2   Technical Implementation

A SMS push sent to the device with a specific format defined in section 2.3.5.1 and 2.3.5.2 of [RCC.07 RCS 5.1] for respectively the push request for initial configuration of a device on which joyn was disabled, and a reconfiguration of an active joyn device, *shall* be enough to trigger a new configuration of a joyn primary device.

For the reconfiguration of primary and secondary devices on which joyn is active already, a reconfiguration shall be triggered by sending an End User Confirmation Request to the device as specified in section 2.3.5.3 of [RCC.07 RCS 5.1].

NOTE: For a joyn Blackbird primary device the reconfiguration can thus be triggered by both the SMS and End User Confirmation request mechanism.

2.6   Managing multiple implementations on the same device

2.6.1   Functional description and User Experience

joyn in its current state only allows one client at a time to run on a device. To ensure the user is aware of this, and to preserve the quality of the end user experience, the following is *required*:

- Whenever a user installs or opens a joyn implementation (App B) on a device on which another joyn implementation is active (App A), the user *should* be informed that there is another joyn client running and that this needs to be disabled before being able to use the new joyn implementation. Each joyn client shall warn the user about the risk of data loss if they change their downloadable joyn application.
- The informative text *shall* include details of the joyn implementation that is currently running (e.g. name and publisher) and provide a shortcut to its settings where the user *shall* be able to disable it. Once the user has disabled it, it *shall* be possible to proceed with the activation of the service.

2.6.2   Dependencies and integration with other features (including multi-device)

Not applicable.

2.6.3   Technical Implementation

The technical implementation for this is platform specific. For now only for the Android™ Operating System a solution has been defined.

NOTE 1:   This applies only to joyn clients (embedded or downloaded). Any joyn value-add service propositions which involve complementing the joyn proposition with additional services or joyn services using alternative platforms are not required to follow the procedures described in this section.

NOTE 2:   It is being studied how a similar mechanism can be provided on other platforms.

In order to prevent having two joyn clients on the same device and, therefore, negative consequences in the user experience, the following mechanism *shall* be implemented by both joyn embedded and downloaded client implementations.

The mechanism is based on the following principles:

- Identifying Android downloadable applications as joyn clients using a Manifest.xml meta-data property.
- Identifying if a joyn client is enabled by accessing its Shared Preferences and reading a property from it.
- Accessing a joyn client settings screen by sending an intent using the action defined as a Manifest.xml meta-data property.

2.6.3.1 Client requirements

Android joyn clients *shall* define the following meta-data properties in their Manifest.xml file.

Name	Value	Description
gsma.joyn.client	true	Used to identify the downloadable application as an joyn client
gsma.joyn.settings.activity	<String>	Equals to the intent action that be used to start the joyn client settings screen

: Android joyn client Manifest meta-data properties

Android joyn clients *shall* define a settings screen activity that can be opened by third party applications **Table 4** using a simple intent whose action string is equal to the value of the "*gsma.joyn.settings.activity*" meta-data property. Sending that intent to open the settings screen *shall* require no permission. Thus, the user decides or not to deactivate the third party application.

The following example illustrates the meta-data that *shall* be added to the Manifest.xml file, as well as a sample settings screen activity.

```xml
<application
  android:icon="@drawable/icon"
  android:label="@string/app_name">

      <!-- the following meta-data is used to identify the application as a joyn client -->
      <meta-data
          android:name="gsma.joyn.client"
          android:value="true" />

      <!-- the following meta-data is used to provide the value of the intent action that can be used by other
      applications to start the joyn client settings screen -->
      <meta-data
          android:name="gsma.joyn.settings.activity"
          android:value="com.vendor.product.MyJoynSettingsActivity" />
       <!-- joyn client shall define a settings property such that it can be open by third party applications using
      an intent which action string corresponds to the meta-data value defined above -->
      <activity
          android:name=".MyJoynSettingsActivity">
          <intent-filter>
              <action
              android:name="com.vendor.product.MyJoynSettingsActivity" />
              <category
              android:name="android.intent.category.DEFAULT" />
          </intent-filter>Table 5
      </activity>
```

: Android meta-data usage

Joyn clients *shall* define a publicly readable Shared Preferences using the name "*gsma.joyn.preferences*".

The shared preferences *shall* be created using the joyn client application context, using the mode MODE_WORLD_READABLE.

The shared preferences *shall* contain a Boolean property named "*gsma.joyn.enabled*".

This property can have two values:

- True: It *will* mean that the joyn client is enabled (user switch in settings set to ON) and the application has been provisioned successfully.
- False (default value): It *will* mean that the joyn client is disabled (user switch in settings set to OFF) or the joyn client has not yet been provisioned.

The joyn client *will* modify the value of this properties according to the rules defined in the section 2.6.3.2.

2.6.3.2 Client start-up behaviour

A joyn client which is started for the first time on an Android device, *shall* next to the other joyn behaviour also perform following actions:
- Retrieve the list of installed applications from the PackageManager, and identify existing joyn clients by looking for the Boolean meta-data property named "gsma.joyn.client", as defined in the previous section.
- For every joyn clients that are found, the client *shall* open their shared preferences named "gsma.joyn.preferences" and retrieve the Boolean property "gsma.joyn.enabled", as defined in the previous section.
- If an existing joyn client is found with the Boolean property "gsma.joyn.enabled" set to "True", it means that client is already active on the device. The new client *shall* inform the user that there is another joyn client already configured in the device and that as a pre-requisite to use the new one, it is necessary to disable it. In the same pop-up the possibility to access the joyn settings of the active joyn application (via intent mechanism) *shall* be offered. The intent action used to open the active joyn client settings screen *shall* be retrieved by reading its Manifest meta-data property named "gsma.joyn.settings.activity".
- If there is no existing joyn client, or none of them are enabled, the new joyn client *may* proceed with provisioning and registration. Once the client is successfully provisioned and registered to the network it *shall* open its own "gsma.joyn.preferences" shared preferences and set its own "gsma.joyn.enabled" property to "True".

2.6.3.3 Client Disabling

If a joyn client on an Android device is disabled (e.g. user switch in settings set to OFF) it *shall* open its own "gsma.joyn.preferences" shared preferences and set its own "gsma.joyn.enabled" property to "False".
The start-up behaviour defined in section 2.6.3.2 shall also apply when:

- There is an attempt to re-activate the disabled client.
- When the disabled client is re-started.

NOTE: In case a disabled client is re-enabled, it shall verify that its current configuration is still valid by performing an HTTP(S) configuration query.

2.7 Branding aspects

Always refer to the GSMA joyn Digital Guidelines [Digiguide] when creating such material.

3   Contacts and capabilities discovery

A joyn enabled device provides a capability discovery mechanism. The capability discovery mechanism is vital to joyn as it enables the end user to see which of his contacts are using joyn services and which joyn services each contact has access to at any given time. Capability discovery detection is the process which provides this information to the user.

3.1   User Experience for Capability Discovery and Contacts

3.1.1   Contact discovery

As soon as joyn is activated on a device and from then on the service *shall* maintain updated information regarding the joyn capability of the contacts in the address book.

The joyn capability is determined via the process of capability exchange and a contact is defined "joyn capable" when at least the joyn chat tag is received during capability exchange with that contact's device.

The Device Capability Detection *shall*

- Ensure exchange of device capabilities
- Scan the entire address book upon first service configuration or re-configuration to determine joyn capable users
- Support scheduled scans of a subset of entries in the address book to update their capability information[2]
- Exchange capabilities with newly added or modified contacts
- Check individual capabilities whenever a communication event is likely to happen with a specific contact (e.g. opening a contact from the phone address book or joyn contact list)

The joyn capability of a contact is removed when:

- In the process of capability exchange the network returns the information that the user is not a provisioned joyn user[3].

- A "triggered removal" shall be applied, when all of the following conditions apply:

    - a joyn contact is selected by the user (e.g. in a group chat picker) and its joyn capabilities are older than an MNO set parameter (CAPABILITY INFO EXPIRY)[4] and the MNO does not request a periodic polling[5] of the capabilities of contacts with obsolete capability information[6]

---

[2] Feature controlled by the parameters CAP INFO EXPIRY and POLLING PERIOD

[3] 404 Not Found error code

[4] This means that for joyn Blackbird the CAPABILITY INFO EXPIRY can also be used if POLLING PERIOD is set to 0

[5] POLLING PERIOD=0

[6] Note that in case POLLING PERIOD is set to any value other than 0, the joyn capability of a contact

- the selection of the contact requires a capability exchange according to the triggers defined in RCS 5.1 and this document
- the response to the capability exchange is inconclusive (i.e. user offline, timeout etc.)
- joyn on the device was disabled from the network[7].

As a result, the contact will be removed from the joyn group and his capability indications will also be removed from the UI. The removal should be notified to the user as this was a user triggered change (e.g. toast message "$username is no longer joyn enabled")

A contact that is discovered as joyn capable (and as long as it remains such) *may* be marked with a joyn indication (as defined in the GSMA Digital Guidelines [Digiguide]) in the following touch points:

- contact list
- contact card
- call log detailed view
- activity log

3.1.2   Service capabilities

The service capabilities determine the real-time availability of the joyn services defined in this document for a specific contact.

A capability update *shall* be triggered within the contact discovery scenarios described in section 3.1.1and whenever a user action or context may indicate that a communication is likely to happen. These cases are described in the section *2.6.3 Capability update for services* of [RCC.07 RCS 5.1] specification.

3.1.3   Availability of joyn services

The availability of a joyn services is influenced by three categories of conditions:

- provisioning status
- device capability and status
- network conditions

Whenever a service is temporarily or permanently not available, the device shall not advertise the related capability (by removing or greying out the associated icon), to prevent other users from initiating a communication that would fail.

---

is only removed when a 404 is received by the network

[7] If invalid configuration was sent or validity of the configuration was set to -1 or -2

3.1.3.1 Provisioning status

A MNO may provision different services for different users and/or devices based on internal policies (e.g. having an active subscription to one service). In the device provisioning phase, the services that are allowed for that user are configured on the device and the device *will* only notify other devices that those services are available to it.

3.1.3.2 Device capabilities and device status

The device implementation and device status *shall* be able to influence the capabilities that are reported on a SIP OPTIONS request:

- The phone is working adequately. If the terminal detects an issue that prevents one or more services from operating, the relevant capabilities *shall* be reported as not available.
- A terminal with limited HW (i.e. no capability to process video) *may not* be able to access all the joyn features and *shall* only provide the capabilities which are available.
- The terminal status: Even if a terminal HW supports all the services, the device status *may* introduce a limitation
- Connectivity status: Certain services *may* require a certain level of network QoS. For example, streaming video over a 2G GPRS does not provide an adequate user experience.
- Some phones *may* prevent use of some or all services when the battery level reaches a certain threshold. In this situation, basic and emergency functionality *should* be prioritised.
- The phone is registered and is able to access IP Multimedia Subsystem (IMS) / joyn core network and relevant servers.

3.1.3.3 Network conditions

The availability of some services may depend on the network conditions (bearer). This is fixed for some services (*2.7 Capability values and status* [RCC.07 RCS 5.1]) and MNO configurable for others.

3.2   joyn implementation into contact list

The address book (and by extension the call-log window) *shall* be the centrepiece to access all joyn services for native implementations. For downloadable applications, it is highly recommended to have a direct entry point to the joyn application or joyn services from the address book. From it, the user *shall* be able to:

- Identify which services are available for each contact: When a contact is selected, the capabilities are updated and the result is presented to the user by showing the joyn services which are available to communicate with that particular contact.
- If one or more joyn services are available, it *shall* be possible to trigger them from the address book/call log entry (except for in-call features).
- If a subset of capabilities is available at a given point in time, all capabilities *shall* be displayed but any unavailable capabilities *should* be greyed out.

- If a service has never been discovered for a specific contact, an implementation may not display the entry points to that service for this specific contact.
- If a contact has more than one joyn capable telephone number assigned, a device *shall* either display for each of these individual numbers which services are available or for each joyn service the individual telephone numbers on which it is available.
- The address book list of joyn capable contacts *must* be cached within the device and updated from time to time according to the polling parameters set by the MNO.

Within the native address book, in the contact list view, the device *must* be able to visually distinguish joyn capable contacts.

- All joyn capable contacts *shall* be marked with the joyn indication (according to GSMA Digital Guidelines [Digiguide]).
- It *should* be possible to filter contacts to display joyn capable contacts only.

3.2.1   Contacts detail page

When a user selects an individual contact from their native address book the contact detail page *shall*, in addition to the normal details, incorporate details about joyn as follows:

- The contact detail header *shall* contain the joyn icon next to the name to indicate that the user is joyn capable.
- The contact detail page *shall* include access to all joyn services/features with the exception of features which are only accessible in CS calls (which *will* be made available in the call screen, please see section 8). The correct joyn iconography as specified by the GSMA Digital Guidelines [Digiguide] *shall* be used. For the joyn Blackbird release, this *shall* apply for the following features[8]:

  - Chat - mandatory
  - Share - mandatory

    - File Transfer

  - Share Contact

- The communication touch points *should* also display a notification overlay to show the user how many unattended communications exist from this contact (unread messages, etc.)
- The contact detail page *should* provide access to blocking functionality, please refer to section 10 of this document.

3.2.2   Contact handling - User Alias

[RCC.07 RCS 5.1] section 2.5.2.1 applies with the following clarifications and modifications:

---

[8] Chat and share entry points are only visible when the phone/application is configured for the converged inbox approach. Whenever the phone is configured for the "fully integrated messaging" approach only the core messaging entry point is shown in the contact card/contact contextual menus

- When the user is not in the Address Book and the alias information is used, the UI should mark that the identity is unchecked and that it may be false (e.g. by colour).
- When the user is not in the Address Book, for Group Chat, the alias name only shall be displayed in the chat history, and the full format shall only be displayed in the Group Chat list of participants.
- The only way in Blackbird to get multiple devices is by installing a specific application (replacing native joyn if any on a native device) that requests the identity of the user.

3.2.3   Contact handling – joyn contacts not in users address book

A capability discovery check shall also be carried out when calling or receiving a call from a MSISDN not included in the contacts list. In this case the capabilities discovered *shall* be stored temporarily in the terminal for one of the following purposes:

- Use of the information during a subsequent IM/chat, file transfer or call (image/video share)
- To add the information to the new contact (both the fact that it is a joyn user and the cached capabilities), if the user decides to add the MSISDN as a new contact.

3.2.4   Contact handling - activities log

By 'activities log' this document refers to logs where all the activities such as SMS and MMS (xMS) messages and calls are aggregated in one place.

The joyn services, Messaging, File Transfer and Content Share, *should* be included in the log. The entries *should* align to the OEMs own design principles for activities logs, but *should* ensure that:

- Messaging entries contain references to the contact with which the messages were exchanged and timestamp.
- File Transfer entries contain references to the contact and timestamp.

- Content Share entries contain reference to the contact, timestamp and, if available, a shortcut to the shared content on the sender's side.

All the above may be marked as a joyn event as defined in the GSMA Digital Guidelines [Digiguide].

3.2.4.1 Requirements for log entries
- From any newly created joyn log entry it *shall* be as straightforward for the user to launch joyn services as it is for voice and SMS.
- From the existing call and messaging logs it *shall* also be possible for the user to launch joyn services.
- The joyn contacts in the existing call and messaging logs and newly created joyn log *shall* be distinguished by the joyn indication, as defined in the GSMA Digital Guidelines [Digiguide], close to the contact's photo/image.

3.2.5   Contact handling - joyn services UI prioritisation

Whenever communication services are listed in native devices, joyn services *shall* always be positioned equally or more prominently than third party communication services. For downloadable applications joyn services should be listed as high as possible.

Communication services *should* be listed in terms of priority in the following order:

1. Traditional (legacy) communication services (voice, xMS) and on joyn-enabled devices, the set of joyn services
2. Other additional services (location, mail, etc.)
3. All other communication services (non-natively implemented)
4. All other services

- UI presentation *may be*, for example, when the user clicks on a photo of a contact within the native address book, they are presented with a shortlist of services available for that contact
- Some device operating systems allow users to have a native list of sharing services available system-wide. This predefined list of sharing services is displayed on multiple touch points across the device UI. When such a native sharing list exists, joyn File Transfer *should* be included and listed within the top native sharing options available

3.2.6   Contact handling – contact with more than one phone number

If a contact has more than one phone number, all numbers shall be clearly identified distinguishing the kind of number (home, work, etc.) and if it is joyn enabled or not.

3.2.7   Contact handling – two contacts sharing the same phone number

If a user has two different contacts with the same phone number which is joyn capable, both names shall be displayed in the chat window with that contact.

3.3   Multi-device support

The choice of supporting multiple devices for a single user *shall* be up to each individual MNO.

3.3.1   Functional requirements for the individual MNO solution

- The behaviour of the solution *will* be as specified in RCS 5.1 to ensure seamless interworking between MNOs.
- The individual solution *shall* not impact the terminal side (that is, there *will* be no changes on the client side).
- For outgoing requests, it is up to the Service Provider's policy to aggregate the capabilities.

3.4   Technical Implementation

3.4.1   Specification References

The capability discovery *shall* in joyn Blackbird clients be performed as specified in section 2.6 of [RCC.07 RCS 5.1]. The capability query and new user discovery using Presence is not in scope for joyn Blackbird. Sections 2.6.1.2, 2.6.1.3, 2.6.2.2 and 2.6.2.3 of [RCC.07 RCS 5.1] and their subsections are thus not applicable for joyn Blackbird. Also section 2.7 of [RCC.07 RCS 5.1] is applicable for the joyn Blackbird capability exchange.

NOTE: Sections 2.6.1.3 and sections 2.6.2.3 of [RCC.07 RCS 5.1] may be applicable to joyn Blackbird networks that provide interworking with non-joyn Blackbird networks. This does not affect the joyn Blackbird clients though.

3.4.2   Configuration Parameters

Configuration parameter	Description
POLLING PERIOD	Service Provider Configurable
POLLING RATE	Service Provider Configurable NOTE: this parameter is not provided when receiving a provisioning document from a legacy network. In case polling is enabled, the client shall poll at a sensible rate.
POLLING RATE PERIOD	Service Provider Configurable NOTE: this parameter is not provided when receiving a provisioning document from a legacy network. In case polling is enabled, the client shall poll at a sensible rate.
CAPABILITY INFO EXPIRY	Service Provider Configurable
CAPABILITY DISCOVERY MECHANISM	Fixed Value: 0 (SIP OPTIONS) SIP OPTIONS *shall* be used for capability discovery NOTE: this parameter is not provided when receiving a provisioning document from a legacy network. In that case the joyn Blackbird client shall use SIP OPTIONS for the capability discovery.
CAPABILITY DISCOVERY VIA COMMON STACK **Table 6**	Not applicable NOTE: this parameter is not provided when receiving a provisioning document from a legacy network.

: RCS additional capability discovery related configuration parameters

3.4.3   joyn Blackbird Specific Technical Behaviour

NOTE**:**   Functionality in this section is considered applicable only for the joyn User Experience and is therefore not reflected in RCS 5.1.

3.4.3.1 Capability Exchange Optimizations

A joyn Blackbird client shall implement a capability exchange optimization mechanism as suggested in section 2.6.4 [RCC.07 RCS 5.1].

Since messaging may, due to the joyn Messaging UI (see section 4), potentially result in many capability exchanges, a configurable limitation is introduced which specifically controls the capability exchange during 1-to-1 messaging:

Configuration parameter	Description	Joyn Blackbird usage
MESSAGING CAPABILITIES VALIDITY	This parameter controls the period during which the capabilities of a contact in a 1-to-1 messaging context (i.e. joyn 1-to-1 chat and xMS) shall be considered valid. If capabilities of that contact were obtained more recently than this configured time, the client shall not initiate a new capability exchange when encountering one of the messaging related capability triggers. A minimum value of 5 seconds shall be used. When the parameter is not provided, no messaging specific timeout will be used. NOTE: the validity time used for the capabilities within the context of other communication is left as a client implementation decision.	Optional Parameter, It becomes mandatory when IM CAP ALWAYS ON is set to 0

Table 7   **: Blackbird Messaging UX Configuration Parameters**

This parameter will be placed in a joyn subtree that will be included as an extension in the configuration document in a joyn subtree provided as a Service Provider specific extension to the capability discovery Managed Objects (MO) sub tree defined in section A.2.8 of [RCC.07 RCS 5.1]:
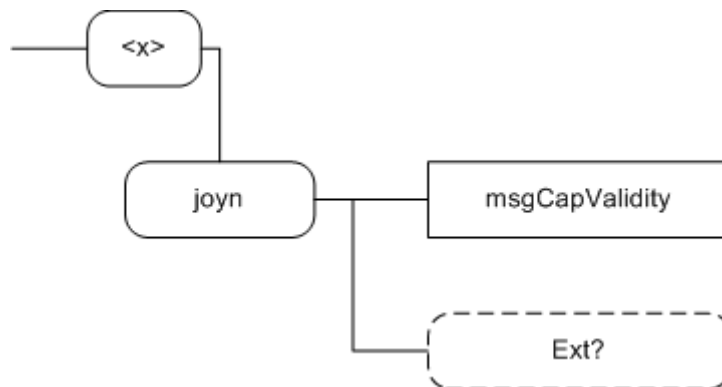
Figure 6

: joyn Blackbird additions, Capabilities Extension sub tree

The associated HTTP configuration XML structure and its integration into the Capability discovery MO is presented in the table below:

```
<characteristic type="CAPDISCOVERY">
        <parm name="pollingPeriod" value="X"/>
        <parm name="pollingRate" value="X"/>
        <parm name="pollingRatePeriod" value="X"/>
        <parm name="capInfoExpiry" value="X"/>
        <parm name="defaultDisc" value="X"/>
        <parm name="capDiscCommonStack" value="X"/>
        <characteristic type="Ext">
                <characteristic type="joyn">
                        <parm name="msgCapValidity" value="X"/>
                        <characteristic type="Ext"/>
                </characteristic>
        </characteristic>
</characteristic>
```

: Capability sub tree associated HTTP configuration XML structure

This sub tree is formally defined as follows: Table 8

Node: <x>/joyn

Under this interior node where the specific RCS parameters related to the joyn capability exchange are placed.

Status	Occurrence	Format	Min. Access Types
Required	One	Node	Get

Table 9   : joyn Capabilities Extension MO sub tree addition node

Values: N/A
- Type property of the node is: urn:gsma:mo:rcs-icapdis:5.1:Ext:joyn:joyn-blackbird
  Associated HTTP XML characteristic type: "joyn"

Node: <x>/joyn/msgCapValidity

The period during which the capabilities of a contact in a 1-to-1 messaging context (i.e. joyn 1-to-1 chat and xMS) shall be considered valid. If capabilities of that contact were obtained more recently than this configured time, the client shall not initiate a new capability exchange when encountering one of the messaging related capability triggers.

If the parameter is not provided, no messaging specific timeout shall be used. It is required to be instantiated if a service provider sets IM CAP ALWAYS ON to 0.

Status	Occurrence	Format	Min. Access Types
Required	ZeroOrOne	Int	Get, Replace

Table 10

: joyn Capabilities Extension MO sub tree addition parameters (msgCapValidity)

- Values: the validity of the capabilities in a 1-to-1 messaging context in seconds. A minimum value of 5 shall be used.

Post-reconfiguration actions: As the client remains unregistered during configuration, there are no additional actions apart from de-registering using the old configuration and registering back using the new parameter.

- Associated HTTP XML characteristic type: "msgCapValidity"

Node: <x>/joyn/Ext

An extension node for Service Provider specific parameters. Clients that are not aware of any extensions in this subtree (e.g. because they are not Service Provider specific) should not instantiate this tree.

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	Node	Get

: joyn Capabilities Extension MO sub tree addition Service Provider Extension Node

Table 11

- Values: N/A
- Type property of the node is: urn:gsma:mo:rcs-icapdis:5.1:Ext:joyn:joyn-blackbird:UX:Ext
- Post-reconfiguration actions: The client should be reset and should perform the complete first-time registration procedure following a reconfiguration
- Associated HTTP XML characteristic type: "Ext"

3.4.3.2 Messaging UI related Capability Exchange triggers

Since messaging exchanges could potentially span over a large period, capabilities as well as the online status of the contact may change during this period. Sufficient messaging specific trigger points for a capability check are therefore required. Due to the joyn Blackbird UI for messaging on the other hand (see section 4), not all trigger points defined in section 2.6.3.1 and 2.6.3.3 of [RCC.07 RCS 5.1] will be relevant in the messaging context. In the following messaging specific cases a capability check *shall* be performed:

- When checking the available RCS services/capabilities to communicate with another user:

  - Message composer is opened (contact already selected e.g. opening an existing thread, returning to the chat screen).
  - After selection of a new recipient for a 1-to-1 message (within the composer).
  - When the user starts or continues typing a message to a known joyn contact towards which no session is active and IM CAP ALWAYS ON (see section 5.3.2) is not enabled.
    NOTE: Given the behaviour required in section 3.4.3.1 this will probably only result in an actual capability check when for example the user returns to the messaging thread after unlocking the screen

- When there is an unexpected communications event with another user in the address book:

- When an xMS is received from a contact with which a joyn Chat session is active and IM CAP ALWAYS ON is disabled

- When a potential error takes place:

  - When an in-session joyn message hasn't been delivered before a timeout (DELIVERY TIMEOUT, see section 4.3.3) and IM CAP ALWAYS ON (see section 5.3.2) is not enabled

A joyn Blackbird client shall not consider other messaging related events, such as for example sending or receiving an SMS or receiving an email, to be a communication event for the purposes of that which is described in section 2.6.3.1 of [RCC.07 RCS 5.1].

NOTE: This section aims to clarify the messaging UI specific trigger points. Next to these, the generic trigger points (e.g. selecting the contact in the address book) and those related to other services remain applicable.

3.4.4   Implementation Guidelines

3.4.4.1 Video Share options exchange (Recommendation)

Taking into account the following arguments:

1. Some solutions (particularly clients) are able to detect when the phone is making a call however, it is not possible for them to detect when the call is answered by the other party because the application layer is not providing this information via events.
2. As a consequence, the caller implementation does not know when is the right time to send the options causing timing issues:

   a) If sent too early, the receiver does not reply with the Video Share and Image Share capabilities because the call is not active
   b) If sent too late, the user experience is bad because the capabilities take a while to appear

3. On the receiver side, it is always possible to capture the event when the user answers the phone so this problem does not present.

PRD IR.74 recommends both parties to do the options exchange just because we cannot assume an embedded implementation which is able to access other APIs than any other mobile operating system (OS) APIs. The following 2 solutions are proposed and acceptable:

- Both (caller and receiver) send OPTIONS
- Only the receiver send OPTIONS because the receiver always knows at all layers when the call is answered and then active

3.4.4.2 Optimization on the options exchange during a call (Recommendation)

It was observed that the radio environment after establishing a call is sometimes unstable and it takes 1-2 seconds to settle (multi-RAB access) leading to packet lost. Therefore, and to avoid this issue, we recommend to introduce a delay of 2 seconds before the OPTIONS message is issued from the receiver.

Also and to make sure that changing conditions of the radio link (e.g. when the handset handovers to 2G and obviously, there is no possibility to run RCS-e services), a SIP OPTIONS message shall be sent every time the screen becomes active during a call (i.e. when the user takes the phone away from his ear to look the screen (proximity sensor triggered)).

4 Integrated messaging

To ensure a tighter integration of joyn services with the core communication touch points, joyn Blackbird devices shall offer an integrated inbox for xMS and joyn messages. This will help service discovery as the users will no longer have to access an additional Chat application to view their conversations but they will find all of them within the familiar "Messaging" application.

Depending on market structure and development, it may be appropriate to extend such integration also to the service entry points and the messaging composer.

Particularly when it comes to joyn native devices, a dedicated 'joyn chat' application is no longer required nor accepted.

This chapter covers the service entry points and service logic for Integrated Messaging, whilst the following chapters 5 One to one Chat, 6 Group Chat and 7 File Transfer, define in detail the respective joyn services from a functional point of view.

4.1 Integrated Messaging experience

In Integrated Messaging a "one button" experience is defined where the entry points to the messaging services are no longer differentiated between xMS and joyn chat and a single, integrated "messaging" application is offered. Within this application xMS and joyn messages exchanged with a contact are threaded together.

The solution aims at ensuring worry free reach for a user's message with the highest richness possible.

4.1.1 Messaging application

The messaging application provides access to the **inbox** where the conversation history is displayed and allows initiation or continuation of a messaging thread via the **integrated composer**.

Conversation history: the inbox shall give access to:

- 1-to-1 message threads: there will be one thread per contact which will include xMS and joyn chat messages plus a record of joyn file shares.
- Group message threads: joyn group chats and xMS broadcast threads will be listed along with 1-to-1 threads.

Visual differentiation between threads: there shall be no difference among 1-to-1 message threads regardless whether they contain only one type of message or a mixture of message types, whilst there may be a differentiation for Group Chat threads which may be identified as joyn events as defined in the GSMA Digital Guidelines [Digiguide].

Where a contact has multiple phone numbers, then a thread should be created for each phone number. The thread name should clearly show which identity is in use (e.g. work, home etc. or MSISDN)

4.1.2   Sender's experience

Entry points for composing a message: there shall be **one single "messaging" option** throughout all existing messaging entry points and it shall lead to the inbox or to the integrated composer.

- **Contact card or contact contextual menu:** the user, regardless of the capabilities of the selected contact, will be taken to the integrated composer which is opened in the context of the thread of messages previously exchanged with that contact (if any).
- **Conversation history:** it shall be possible to continue a thread of messages previously exchanged with one contact. Selection of an item of the conversation history will open the integrated composer.
- **Inbox/messaging application:** in case the messaging application provides the possibility of composing a new message from scratch, two options shall be offered: "new message" which leads to the integrated composer and "new joyn group chat" for which the behaviour is described in 4.1.5

The integrated composer is the element which allows the user to compose a message and applies the appropriate delivery policies to ensure timely delivery with the best fidelity available.

NOTE: In the following text we refer to xMS and joyn composer, however these are actually the same composer with the difference that, when sending an xMS, only the supported functionality for xMS will be offered (e.g. message length or attachments supported by MMS) and when sending via joyn all the functionality supported by joyn will be available (e.g. location etc.). If xMS composer is used and there are restrictions in message length etc. then this should be indicated to the user within the UI.

The following rules shall be implemented in the composer:

- When A-party has no data coverage then all messages are sent and received as SMS.

  - When message is sent as SMS, the user will be able to add text based emoticons, see section 5.1.3.1, however the receiver may or may not be able to visualize them graphically; delivery notifications may be requested via SMS, upon user choice or network default configuration. Displayed notifications will not be available. A visual indication in the composer will highlight that the user is sending an SMS and, once sent, the message will be marked accordingly.
For files, an MMS is composed and locally queued. Appropriate notifications will inform the user that messages will be sent when data connectivity is restored.

- When A-party has data coverage, capabilities of B-party are silently discovered. If B is currently reachable on joyn then message is sent as joyn chat, otherwise as SMS[9] [10]. Even for B parties which are joyn enabled but offline, SMS is used instead of joyn Store and Forward, as the primary objective of a message is reaching the recipient and SMS may be available when joyn is not (e.g. receiver has no data coverage, but GSM coverage).

  - When the message is sent as joyn, the joyn chat experience, see section 5.1.1, specified in this document applies (user will be able to add emoticons and files, and delivery and read notifications will be available). A visual indication in the composer will highlight that the user is sending a joyn message and, once sent, the message will be marked accordingly.
    When the message is sent as SMS, the user will be able to add text based emoticons, see section 5.1.3.1, however the receiver may or may not be able to visualize them graphically, and delivery notifications may be requested via SMS, upon user choice or network default configuration. Displayed notifications will not be available. A visual indication in the composer will highlight that the user is sending an SMS and, once sent, the message will be marked accordingly.
    If joyn cannot be applied, files will be sent as MMS and the restrictions of such technology on file type and size will apply. User shall not be given the option of selecting files that are not compatible with the MMS technology.

- When A party has data coverage but no GSM coverage, messages to joyn available contacts will be sent via joyn, all other messages will be queued locally as SMS and delivered as soon as connectivity is restored

The user shall be able to override the device choice in terms of sending technology and switch to the alternative technology on a per-message basis. The rationale is to give enough confidence to the users that they are in control of the communication channel and to help handling edge cases. Once the technology has been changed, the choice will remain valid until any of the conditions described later on in paragraph 4.1.4.1 is verified.

A "one time" warning may be shown to the user when the composer changes the sending technology while the user is typing a message, informing them that xMS or joyn data services are charged as per their tariff. The user shall have the possibility to dismiss it permanently.

4.1.2.1 Service availability

In general, it shall always be possible to send a 1-to-1 message via the integrated composer according to the rules defined above. Initiation or continuation of a joyn group chat, however,

---

[9] Note that until the response on B-party capabilities is received and definitively confirms that joyn is available, the message composer will be the xMS composer, being the lowest common denominator.

[10] If the message is composed before selecting a recipient the xMS composer will be used. Upon contact selection, if joyn capabilities are discovered, the further functionalities from joyn may then be offered.

will be subject to the sender having data connectivity and being connected to the joyn service. When this is not available, it shall not be possible to initiate a new group chat and messages typed in an existing group chat thread shall be locally queued (alternatively, composing messages in group chat threads while offline may be disabled).

The selection of the sending technology (xMS or joyn) must be as accurate as possible so that no delay in message delivery is introduced (e.g. by sending a joyn message while the recipient is offline). In order to have this accuracy, capability updates shall be performed when appropriate as specified in section 3, (see in particular section 3.4.3.2).

Through configuration settings a MNO shall be able to amend the standard policies defined above by forcing either of the two following behaviours:

- **Always send messages via joyn**: a MNO who is able to provide breakout of joyn chat messages to SMS, may request that messages to joyn enabled users are always sent via joyn. This may be obtained by making the joyn chat capability always available for joyn contacts[11].
- **Always send files via joyn**: under the assumption that if a contact has joyn, joyn is active whenever there is connectivity, a MNO may opt to prioritize the richness of joyn file sharing over MMS and, relying on Store and Forward, request that files are sent via joyn also for joyn contacts who are currently offline. This may be obtained by making the joyn file sharing capability always available for joyn contacts[12][13]. In such case, an implementation may warn the sender that recipient is not able to receive the file at that time.

A user shall be able to disable the joyn messaging functionality in the settings screen.

Offline mode: Messages will be locally stored and sent when connectivity is restored. Depending on device configuration[14] the message will be sent as either xMS or as joyn chat. A notification of the offline status should be displayed to the user (a grey text displayed in the composer text box is suggested).

For clarification, the service being chosen to send messages is summarized in the following table. The upper half of the table applies for IM CAP ALWAYS ON = 1, whereas the bottom half shall apply for IM CAP ALWAYS ON = 0

---

[11] With the IM CAP ALWAYS ON parameter

[12] In fact, only for joyn Blackbird contacts who support File Transfer Store and Forward procedures, ref. chapter 7.

[13] With the FT HTTP CAP ALWAYS ON parameter

[14] IM CAP ALWAYS ON

IM CAP ALWAYS ON = 1						
User A: sender	GSM	Yes	Yes	Yes	No	No
	Data	Yes	No – out of coverage	No – user de-selected	Yes	No
User B: receiver	GSM	Irrelevant	n/a	n/a	Yes	n/a
	Data	Irrelevant	n/a	n/a	Yes	n/a
Used service	Default	joyn	joyn	xMS	joyn	joyn*
	User choice	xMS	xMS	joyn*	xMS*	xMS*

*- on device caching of unsent messages required and user shall be informed

: IM CAP ALWAYS ON = 1

Table 12

IM CAP ALWAYS ON = 0								
User A: sender	GSM	Yes	Yes	Yes	Yes	Yes	No	No
	Data	Yes	Yes	Yes	Yes	No	Yes	No
User B: receiver	GSM	Yes	Yes	No	No	n/a	Yes	n/a
	Data	Yes	No	Yes	No	n/a	Yes	n/a
Used service	Default	xMS	xMS	xMS	xMS	xMS	xMS	xMS*
	Change to after capability confirmation	joyn	xMS	joyn	xMS	xMS	joyn	xMS*
	User choice	xMS	joyn	xMS	joyn	joyn	xMS	joyn

* - on device caching of unsent messages required

Table 13

: IM CAP ALWAYS ON = 0

4.1.3   Receiver experience

Regardless of the receiver's connectivity and message delivery technology, any incoming message will be threaded on a contact-basis and displayed with the maximum available fidelity with an indication of the technology of its delivery. For Blackbird user with full integrated messaging, a consolidated notification shall indicate the incoming of new messages. When opening the notification, the messages, regardless whether they are xMS or joyn, shall be displayed in the order they are sent based on the timestamp they carry.

4.1.4   Experience within a conversation

The experience while exchanging messages will adapt to the technology that is currently being used. When only xMS is available, the traditional, basic xMS experience will remain unchanged. When messages are exchanged via joyn the experience described in chapter 5 below applies (most visible difference will be delivery/display notification and is typing indication).

Message differentiation: as hinted in the paragraphs above, messages sent via SMS and via joyn shall be labelled accordingly in order to set user expectations in terms of richness of the content and feedback on message delivery. Labelling shall be clear but at the same time non-intrusive.

Despite the fact that the user will be able to distinguish, in a same thread, SMS, MMS and joyn chat messages, a minimum level of consistency is anyway expected for each contact, where it is expected that for joyn enabled contacts joyn will be the technology used in most cases, with xMS becoming a sort of emergency fall-back.

4.1.4.1   Rules for switching sending technology while in a conversation

N.B. These requirements shall apply only to MNO setting IM CAP ALWAYS ON = 0 unless stated literally; for IM CAP ALWAYS ON = 1 please refer to section 4.2.2.1 and the amended explanatory table

This paragraph aims at defining the rules for switching between xMS and joyn (and vice-versa) while in a conversation. The conversation is defined as an active exchange of messages between the two parties, it starts after the first message is sent and it is delimited by technical events (e.g. session end) and user interactions (e.g. user leaving the thread view) which are defined more in depth below.

The end to end availability of joyn can be affected by the following conditions:

- Sender offline
- Receiver goes offline

If both sender and recipient have an integrated messaging solution, the sending technology should change as soon as updated information on the receiver's capability is available or conditions change at the sender side[15]. This is because both sender and receiver will consistently receive messages in one thread.

A generic recipient who **does not** have an integrated messaging solution, however, will receive xMS and joyn messages in separate screens if not in separate applications. Therefore, wherever possible, consistency in sending technology needs to be pursued to avoid breaking the conversation history and severely affecting the receiver's experience. This means that some policies shall be implemented to manage updated information on the end to end capabilities that may have become available during a conversation.

---

[15] Although some transitory conditions like a re-registration upon IP reconfiguration (e.g. 3g to Wi-Fi handover) should be hidden from the user to avoid perception of instability.

- **Loss of IP connectivity[16] (i.e. joyn offline status) at sender side:**

  - If conversation is an xMS conversation, the event is irrelevant and conversation continues in xMS mode.
    If conversation is a joyn conversation:

    - As long as the sender is viewing the conversation or composing a message in the active window, messages shall be locally queued as joyn messages. After a certain timeout[17], the technology shall be changed to the one available and the user shall be prompted to send the messages via xMS. If user rejects, sending shall be reattempted as soon as connectivity is restored.
    - If the sender leaves the conversation view or the screen times out, when re-entering the conversation the available technology shall be used.

- **IP connectivity restored (i.e. joyn online status) at sender side:**

  If conversation is an xMS conversation

  - As long as the sender is viewing the conversation or composing a message in the active window, messages shall be sent as xMS
  - If the sender leaves the conversation view or the screen times out, when re-entering the conversation the available technology shall be used.

  If conversation is a joyn conversation the event is irrelevant and conversation continues in session as joyn[18]

- **Loss of IP connectivity (i.e. joyn offline status) at receiver side.** It has to be noted that this information may not be immediately available to the sender as this is subject to the occurrence of an event that triggers a capability exchange.

  - As long as the sender is not aware of the change in conditions of the recipient, the incumbent sending technology shall be kept. Specifically, if a joyn session[19] was active, new messages shall be still sent "in session" and if the conversation was an xMS conversation, new messages shall be still sent as xMS.
    When the sender becomes aware of the offline status, if conversation is an xMS conversation, the event is irrelevant and conversation continues in xMS mode.
    When sender becomes aware of the offline status and if the conversation is a joyn conversation:

---

[16] If IM CAP ALWAYS ON is on then loss of connectivity on receiver side is irrelevant

[17] This timeout is defined by the parameter DELIVERY TIMEOUT

[18] This could occur when recipient briefly disconnects and sender, not being aware, had sent offline messages. The underlying MSRP session may not have expired when the next capability check happens, and that would basically only confirm that recipient is online; sender would keep sending via joyn, while Store and Forward messages are delivered.

[19] MSRP session.

- As long as the sender is viewing the conversation or composing a message in the active window and until the joyn IM session expires for timeout, messages shall be sent in session as joyn. If after a certain timeout duration[20], the messages are still undelivered, the user shall be actively informed and offered the option to re-send the messages via xMS (the user shall be able to confirm, dismiss and set their choice as the default behaviour).
  - If the sender leaves the conversation view or the screen times out, when re-entering the conversation the available technology shall be used. If there are undelivered joyn messages, user shall be actively informed and offered the option to re-send the messages via xMS (the user shall be able to confirm, dismiss and set their choice as the default behaviour).
  - If an xMS is received from the recipient, technology shall be switched to xMS. If there are undelivered joyn messages, user shall be actively informed and offered the option to re-send the messages via xMS (the user shall be able to confirm, dismiss and set their choice as the default behaviour).

- **IP connectivity restored (i.e. joyn online status) at receiver side.** It has to be noted that this information may not be immediately available to the sender as this is subject to the occurrence of an event that triggers a capability exchange.

  - As long as the sender is not aware of the change in conditions of the recipient, the incumbent sending technology shall be kept. Specifically, if a joyn session[21] was active, new messages shall be still sent "in session" and if the conversation was an xMS conversation, new messages shall be still sent as xMS.
    When sender becomes aware of the online status and if the conversation is an xMS conversation:

    - As long as the sender is viewing the conversation or composing a message in the active window, messages shall be sent as xMS.
    - If the sender leaves the conversation view or the screen times out, when re-entering the conversation, the available technology shall be used.
    - If the recipient sends a joyn message, the technology shall be switched to joyn.

    When sender becomes aware of the online status and if the conversation is a joyn conversation the event is irrelevant and conversation continues in session as joyn[22].

---

[20] This timeout is defined by the parameter DELIVERY TIMEOUT

[21] MSRP session.

[22] This could occur when recipient briefly disconnects and sender, not being aware, had sent offline messages. The underlying MSRP session may not have expired when the next capability check happens, and that would basically only confirm that recipient is online; sender would keep sending via joyn, while Store & Forward messages are delivered.

4.1.5   Group messaging

The messaging application shall also support group messaging. This may be triggered in the following ways:

- **Ad hoc setup of a group messaging session:** as described in 4.1.2 two out of the available contact/conversation context options are offered when accessing the messaging application:
  - o **New Message**: this will lead to a contact picker within the composer. If only one user is selected, the case becomes a 1-to-1 conversation as described above. If more than one user is selected a broadcast message (i.e. a batch of 1-to-1 xMS) is used as the default mode.
  - o **New joyn Group Chat**: a contact picker with only joyn chat enabled contacts will be offered and a group chat as defined in this document will be initiated.

- **Adding a recipient to an existing 1-to-1 conversation**: an "add user" option shall be offered within the conversation thread, this shall offer the user two choices:
  - o the creation of a broadcast xMS: this functionality is always available and for all contacts in the users address book.
  - o only when in a joyn composer, the possibility of extending to a joyn group chat: this functionality will only be available with joyn enabled contacts in the user's address book.

- **Replying to an existing thread in the conversation history:** replying to a thread in the conversation history shall happen with the same technology that was used to set it up.
  - o xMS broadcast thread: if user composes a new message, another xMS broadcast will be initiated.
  - o joyn group chat thread: if user replies to an existing group chat thread, the group chat will be restarted or continued according to the functional description and UX provided in this document.

4.1.6   User flows

The following diagram describes the user flows to initiate the different types of 1-to-1 and group conversation specified in this section.

Inbox
> List of 1-to-1 threads, xMS broadcast, group chats
> Entry points for new message and new group chat

Generic composer
> Compose a message outside an existing thread (i.e. before selecting recipient)
> Selection of multiple recipients generates a broadcast xMS

1-to-1 thread:
> all messages exchanged w/ one contact (joyn/xMS)
> visual differentiation xMS vs joyn
> delivery notifications for all messages (xMS optional), display and 'is typing' only for joyn.

1-to-1 thread:
> Files added as MMS when joyn e2e not available

Add recipient to 1-to-1 thread:
> xMS broadcast is created

Group Chat contact picker
> Select multiple joyn enabled contacts
> Set a subject for the group chat

Group Chat thread
> See online participants and who is typing

Broadcast message contact picker
> Select multiple contacts among all contacts in address book

Broadcast message thread
> See list of recipients and messages sent (replies will be threaded in the 1-to-1 threads with the specific contact)
(>See replies if group MMS)

Figure 7

Various user flows for 1 to 1 and Group Chat

4.1.7   Sending files

Further to what is described in 4.1.2 regarding sharing files while in messaging conversation, another entry point for sharing files will be the file browser (or in general any application that supports a sharing functionality, e.g. a gallery or music player). In such context there should be two sharing options:

1. **Messaging:** this can only be used for sharing with one recipient and will lead to the integrated composer where, after contact selection, the file will be attached or adapted to the technology available based on the capabilities of the receiver. There may be a case where MMS only can be used and the selected file is not compatible with the technology, in such case the user shall be presented with an error and no file will be sent.
2. **Group chat:** this can be used for sharing files with multiple joyn contacts. As described in section 7.2, the functionality will be available for all joyn recipients even if offline (as long as the group chat can be initiated).

Regarding the experience of the file sharing itself, the established behaviour for MMS shall be followed when MMS is the sending technology and the functional description and UX prescribed in this document for joyn file transfer shall be applied when the technology is joyn.

4.1.8   Naming and iconography

In general the core messaging iconography shall be used across the entry points. Please see the GSMA Digital Guidelines [Digiguide] for more information.

4.2   Dependencies and interaction with other features

Realization of integrated messaging on downloadable applications: a standalone application should be able to provide the inbox and composer experience described in **Error! Reference source not found.** and 4.1. However there will be some peculiarities and limitations in terms of integration with entry points.

- In the "two button" scenario, if Integrated Messaging should not be feasible (e.g. OS limitations) , the application shall be able to intercept the "new message" command when user hits the SMS touch points throughout the device (e.g. the SMS touch point in the contact card, or the "share via messaging" in the gallery) and use the integrated messaging application to compose and send the SMS.
- In the "one button" scenario, i.e. Integrated Messaging solution, the "new message" command shall open the integrated messaging application and then the policy described in 4.1.2.
- Duplication of incoming message notifications should be avoided (e.g. from SMS application and integrated messaging application).
- "Delivered" message status in the downloadable application and in the core messaging application shall be synchronized (i.e. a SMS received in the joyn integrated messaging inbox is marked as delivered in the core SMS application).
- Message history (including folders) shall be synchronised between the downloadable application and the core messaging app.

- MMS support can be limited to a text body with one or more attachments, Synchronized Multimedia Integration Language (SMIL) support is not required.

Multi-device: integrated messaging can only be offered on a user's primary device (i.e. the device defining a user's identity) equipped with a SIM card thus supporting sending/receiving xMS).

From a receiver's point of view, however, xMS will only be received on the device equipped with a SIM card, while joyn messages may be received on all the joyn enabled devices.

There are a number of cases where the recipient has multiple devices in which the end to end capability detection may mislead the sender to choose a technically feasible technology which is not the most appropriate one from a user standpoint, i.e. a generic joyn recipient may be offline (for joyn) on their primary device but online on a secondary device. In such case the capability exchange will result in a message being sent as joyn by an "Integrated Messaging" sender and correctly delivered but not reaching the actual recipient.[23]

This is acknowledged as a limitation of the current solution until network storage and advanced/configurable delivery policies are available. The customer impact, given the market penetration of joyn devices at the time this document is written and given that it is already planned to provide a network solution in the next release of the joyn standard based on what is already specified in RCS 5.1, will initially be negligible. The risk is hence deemed acceptable in comparison to the advantages of providing an integrated experience for the sender.

4.3   Technical realisation

NOTE: As Integrated Messaging is mainly UI related, it is a joyn specific topic.

4.3.1   Users reachable on joyn

For the behaviour defined in sections 4.1.2 and 4.1.4.1 a contact shall be considered as reachable on joyn if the capability exchange results in a response that includes the Chat capability defined in section 2.6.1.1.2 of [RCC.07 RCS 5.1] and that does not include the *automata* tag defined in [RFC 3840].

Note: The *automata* tag defined in [RFC 3840] is used to indicate that a response does not originate from an end user device.

4.3.2   Integrated Messaging Capability

To realize the behaviour specified in section 4.1.4.1, a client must be able to indicate to a contact that in its UI for messaging it is currently using the Integrated Messaging experience described in section 4.1 (i.e. the MESSAGING UX client configuration parameter defined in section 4.3.3 is set to 1). It shall do this by including following capability in the capability exchange (see section 3):

---

[23] A receiving network supporting multiple devices, may implement custom policies in their OPTIONS server for the responses to capability requests containing the "fully integrated messaging" tag, so that only the capabilities of the primary device are forwarded.

RCS service	Tag
Integrated Messaging	+g.3gpp.iari-ref="urn%3Aurn-7%3A3gpp-application.ims.iari.joyn.intmsg"

: SIP OPTIONS tag for Integrated Messaging

4.3.3   Configuration Parameters

For joyn Blackbird, the configuration parameters available in RCS 5.1 will be extended with following additional parameters controlling the messaging UX:

Configuration parameter	Description	Joyn Blackbird usage
MESSAGING UX	This parameter is provided for historical reasons only and will have a fixed value of 1 to avoid interoperability problems with implementations based on earlier versions of this specification. Clients may ignore this parameter while for a network it is mandatory to include it in the configuration document.	Mandatory Parameter

Table 15   **: Blackbird Messaging UX Configuration Parameters**

Furthermore, the configuration parameters available in RCS 5.1 will be extended with the following additional parameters controlling the switch over behaviour between messaging technologies that are part of the Integrated Messaging experience defined for joyn Blackbird:

Configuration parameter	Description	Joyn Blackbird usage
DELIVERY TIMEOUT	This parameter controls the timeout for the reception of delivery reports for joyn messages after which a capability check is done to verify whether the contact is offline (see section 4.1.4.1). When set to 0 the timeout shall not be used as a trigger for the capability exchange. A default value of 300 seconds is used in case the parameter is not provided	Optional Parameter
FT HTTP CAP ALWAYS ON **Table 16**	This parameter controls whether when the Integrated Messaging experience is used, 1-to-1 File Transfer is available to all contacts supporting File Transfer via HTTP regardless of their online status (1) or only to those contacts that are online (0)	Optional Parameter It becomes mandatory when MESSAGING UX is set to 1.

: Blackbird Messaging behaviour Configuration Parameters

The UX parameters defined in Table 15 will be placed in a UX MO subtree located in the Service Provider Specific sub tree defined in section A.2.11 of [RCC.07 RCS 5.1]:
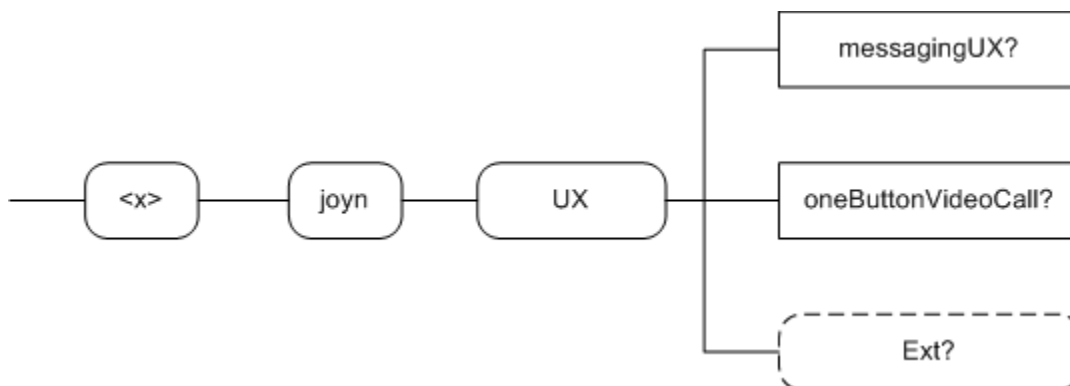
: joyn Blackbird additions, UX sub tree

Figure 8

The associated HTTP configuration XML structure is presented in the table below:

```
<characteristic type="UX">
    <parm name="messagingUX" value="X"/>
    <characteristic type="Ext"/>
</characteristic>
```

: UX sub tree associated HTTP configuration XML structure

Table 17

This structure will be included into the configuration document defined in section A.3 of [RCC.07 RCS 5.1] as follows:

```
<?xml version="1.0"?>
<wap-provisioningdoc version="1.1">
    <characteristic type="VERS">
        <parm name="version" value="1"/>
        <parm name="validity" value="1728000"/>
    </characteristic>
    <characteristic type="TOKEN">
        <parm name="token" value="X"/>
        <parm name="validity" value="3456000"/>
    </characteristic>
    <characteristic type="MSG">                    -- This section is OPTIONAL
        <parm name="title" value="Example"/>
        <parm name="message" value="Hello world"/>
        <parm name="Accept_btn" value="X"/>
        <parm name="Reject_btn" value="X"/>
    </characteristic>
    <characteristic type="APPLICATION">
        <parm name="AppID" value="ap2001"/>
        <parm name="Name" value="IMS Settings"/>
        <parm name="AppRef" value="IMS-Settings"/>
        …
    </characteristic>
    <characteristic type="APPLICATION">
        <parm name="AppID" value="ap2002"/>
        <parm name="Name" value="RCS settings"/>
        <parm name="AppRef" value="RCSe-Settings"/>
        <characteristic type="IMS">
        <parm name="To-AppRef" value="IMS-Settings"/>
        </characteristic>
        <characteristic type="SERVICES">
        …
```

```
        </characteristic>
        <characteristic type="PRESENCE">
        …
        </characteristic>
        <characteristic type="XDMS">
        …
        </characteristic>
        <characteristic type="SUPL">
        …
        </characteristic>
        <characteristic type="IM">
        …
        </characteristic>
        <characteristic type="CPM">
        …
        </characteristic>
        <characteristic type="CAPDISCOVERY">
        …
        </characteristic>
        <characteristic type="APN">
        …
        </characteristic>
        <characteristic type="OTHER">
        …
        </characteristic>
        <characteristic type="SERVICEPROVIDEREXT">
            <characteristic type="joyn">
                <characteristic type="UX">
                …
                </characteristic>
                <characteristic type="Messaging">
                …
                </characteristic>
            </characteristic>
        …
        </characteristic>
    </characteristic>
</wap-provisioningdoc>
```
Table 18

: Complete RCS HTTP configuration XML structure

Note: The Messaging characteristic which is a sub-element of the joyn characteristic is described further in this section.

The parameters for the UX configuration are formally defined as follows:

Node: <x>/joyn

Under this interior node where the specific RCS parameters related to joyn are placed.

Status	Occurrence	Format	Min. Access Types
Required	One	node	Get

Table 19

: joyn MO sub tree addition node

- Values: N/A
- Type property of the node is: urn:gsma:mo:rcs-sp:5.1:joyn:joyn-blackbird

- Associated HTTP XML characteristic type: "joyn"

Node: <x>/joyn/UX

Under this interior node the RCS parameters related to UX are placed.

Status	Occurrence	Format	Min. Access Types
Required	One	node	Get

: UX MO sub tree addition node

- Values: N/A
- Type property of the node is: urn:gsma:mo:rcs-sp:5.1:joyn:joyn-blackbird:UX
  Table 20
- Associated HTTP XML characteristic type: "UX"

Node: <x>/joyn/UX/messagingUX

Leaf node that is provided only for historical reasons to avoid compatibility problems with implementations based on earlier versions of this specification and which will be set to a fixed value. Clients may ignore this parameter while for a network it is mandatory to include it in the configuration document.

Status	Occurrence	Format	Min. Access Types
Required	One	Bool	Get, Replace

Table 21   : UX MO sub tree addition parameters (messagingUX)

- Values:
  0, This value shall not be used
  1, only this value shall be used for joyn Blackbird
- Post-reconfiguration actions: As the client remains unregistered during configuration, there are no additional actions apart from de-registering using the old configuration and registering back using the new parameter.
- Associated HTTP XML characteristic type: "messagingUX"

Node: <x>/joyn/UX/Ext

An extension node for Service Provider specific parameters. Clients that are not aware of any extensions in this subtree (e.g. because they are not Service Provider specific) should not instantiate this tree.

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

Table 22

: UX MO sub tree addition Service Provider Extension Node

- Values: N/A
- Type property of the node is: urn:gsma:mo:rcs-sp:5.1:joyn:joyn-blackbird:UX:Ext

- Post-reconfiguration actions: The client should be reset and should perform the complete first-time registration procedure following a reconfiguration
- Associated HTTP XML characteristic type: "Ext"

The Messaging that will be included in the configuration document in a Messaging MO subtree of the joyn subtree defined earlier in this section as shown in Figure 9:
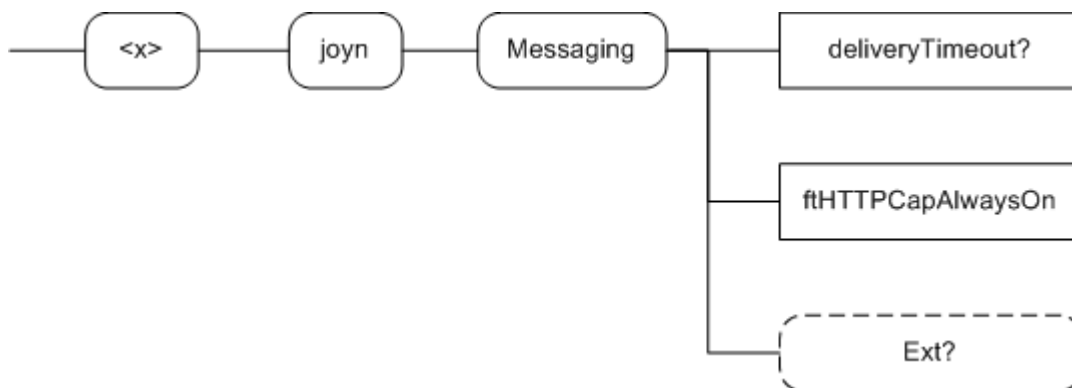
Figure 9   **: joyn Blackbird additions, Messaging sub tree**

The associated HTTP configuration XML structure is presented in the table below:

```
<characteristic type="Messaging">
    <parm name="deliveryTimeout" value="X"/>
    <parm name="ftHTTPCapAlwaysOn" value="X"/>
    <characteristic type="Ext"/>
</characteristic>
```

Table 23

: Messaging sub tree associated HTTP configuration XML structure

This structure will be included into the configuration document defined in section A.3 of [RCC.07 RCS 5.1] as shown in Table 18.

The parameters for the Messaging behaviour configuration are formally defined as follows:

Node: <x>/joyn/Messaging

Under this interior node the RCS parameters related to the joyn specific messaging behaviour are placed.

Table 24 Status	Occurrence	Format	Min. Access Types
Required	One	node	Get

: Messaging MO sub tree addition node

Values: N/A

Type property of the node is: urn:gsma:mo:rcs-sp:5.1:joyn:joyn-blackbird:Messaging

Associated HTTP XML characteristic type: "Messaging"

Node: <x>/joyn/Messaging/deliveryTimeout

Leaf node that configures on a device providing the Integrated Messaging experience the timeout for the reception of delivery reports after which a capability check is performed to verify if the contact is offline (see section 4.1.4.1).

The node is optional and if not provided the default value of 300 seconds will be used

Status	Occurrence	Format	Min. Access Types
Required	ZeroOrOne	int	Get, Replace

: Messaging MO sub tree addition parameters (deliveryTimeout)

Value**Table 25** ger value defining the timeout to be used in seconds, when set to 0 the timeout shall not be used as trigger for a capability check

Post-reconfiguration actions: As the client remains unregistered during configuration, there are no additional actions apart from de-registering using the old configuration and registering back using the new parameter.

Associated HTTP XML characteristic type: "deliveryTimeout"

Node: <x>/joyn/Messaging/ftHTTPCapAlwaysOn

Leaf node that describes whether when the Integrated Messaging experience is provided the File Transfer via HTTP capability needs to be on independently of whether or not the other end is registered. For example this can be used by Service Providers preferring the user experience of 1-to-1 File Transfer to offline users over the use of xMS based messaging.

It is required to be instantiated if a service provider enables the Integrated Messaging experience.

	Status	Occurrence	Format	Min. Access Types
Table 26	Required	ZeroOrOne	bool	Get, Replace

: Messaging MO sub tree addition parameters (ftHTTPCapAlwaysOn)

- Values:
  0, File Transfer via HTTP can be used only to File Transfer via HTTP capable contacts that are online (see section X.4.1)
  1, File Transfer via HTTP can be used with all File Transfer via HTTP capable contacts regardless of their current status.
- Post-reconfiguration actions: As the client remains unregistered during configuration, there are no additional actions apart from de-registering using the old configuration and registering back using the new parameter.
- Associated HTTP XML characteristic type: "ftHTTPCapAlwaysOn"

Node: <x>/joyn/Messaging/Ext

An extension node for Service Provider specific parameters. Clients that are not aware of any extensions in this subtree (e.g. because they are not Service Provider specific) should not instantiate this tree.

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

: Messaging MO sub tree addition Service Provider Extension Node

- Values: N/A

Table 27
- Type property of the node is: urn:gsma:mo:rcs-sp:5.1:joyn:joyn-blackbird:Messaging:Ext
- Post-reconfiguration actions: The client should be reset and should perform the complete first-time registration procedure following a reconfiguration
- Associated HTTP XML characteristic type: "Ext"

4.4   Classification

The support of integrated messaging is mandatory for native device implementation and highly recommended for downloadable applications (due to known feasibility limitations for the latter).In particular, a downloadable application may implement the "two button experience" by implementing a standalone chat application as for joyn Hotfixes [Hot Fixes]given the minimum added value of replicating the SMS history in a non-integrated Messaging application.

All screen wireframes provided in the document are purely indicative

5   One to one Chat

5.1   User Experience for 1 to 1 Chat

5.1.1   Sender's experience

Entry points for initiating a joyn chat: entry points to joyn chat depend on the approach to integration of messaging defined by the MNO. For the Integrated Messaging approach refer to 4.1.2.

Service availability: All networks adhering to joyn have to support a store and forward functionality which allows users to send messages to offline contacts. However depending on the MNO choice (for example depending on the use of Integrated Messaging), a client may be configured to indicate joyn chat is always available for joyn contacts or only available when the recipient has been detected as online.[24]

5.1.2   Receiver's experience

Receiving a joyn chat: When receiving a joyn chat message, a notification *shall* be displayed according to the notification principles for core communication services of the

---

[24] As indicated by IM CAP ALWAYS ON

device. Opening the notification *shall* lead to the conversation thread where the message belongs and allow the receiver to respond.

5.1.3   In-chat functionality

Message body: All characters and automatic word suggestion mechanisms supported by the device in any language need to be available when typing a new message and supported when viewing a received message. No loss of integrity *shall* happen when the message is transferred.

Message threading: All messages exchanged 1-to-1 with the same contact *shall* be threaded in the same chat thread.

Note: Where a contact has multiple phone numbers, then a thread should be created for each phone number. The thread name should clearly show which identity is in use (e.g. work, home and so on).

Message status notifications: The joyn solution relies on delivery notifications rather than on contact status information in order to give users feedback on the reach of their communications. Below are the joyn message statuses and their relation to the protocol states is described in section 5.3.4.1.

- **Pending:** once the message has been submitted by the user and while it is locally queued on the device waiting for transmission to the network (including the case in which sender has no connectivity).
- **Sent:** when the message has been transferred to the network and before it is delivered to the recipient (including the period of time in which the message is stored in the network waiting for recipient to be online).
- **Delivered:** When the message has reached the receiving end.
- **Displayed (read):** When the message has been displayed in the Chat view on the receiving device.
- **Failed:** When the message cannot be delivered due to a network or client failure, after three automatic re-try attempts, an 'alert/ failed' icon/text *shall* be displayed on the initiating device, following the specific application's UI principles. In this situation, the user *should* be presented with an option to retry/resend the message without having to re-type it.

It is mandatory for a joyn implementation to support at least delivered and displayed notifications and to visualise them contextually to the message, in line with the device/application UI principles. An implementation may also support pending and sent notifications according to the definition above.

Is typing notifications: In order to enhance the real-time messaging experience, a notification *shall* be displayed when the other end starts typing a message.

Message order and timestamp: Received messages in a chat shall be displayed in the order they have been sent. Sent messages shall be inserted into the thread as they have been created.

The network will ensure that delivery of new incoming messages on the receiving device follows the successful delivery of stored messages from the sending device. The timestamp of each message is determined by the sending network (see section 4.3.4.2 of [RCC.07 RCS 5.1]) as an absolute time (UTC time zone), which shall then be adapted by the chat application to the user's current time zone. For example a message sent at 14.00 UTC will be displayed as sent at 15.00 for a user in the Central Europe time zone.

Emoticons: The joyn chat allows sending smileys from the standard set of emoticons defined in section 5.1.3.1 and Annex 14. Access to emoticons *must* be direct and visible in the normal chat composing interface.

Ending a chat: The 1-to-1 chat has no visible end. Despite the way it is technically realised, to the user it *will* always appear as a thread of messages to which they can reply at any time. The user may switch to other screens any time during or after a chat without affecting the chat history or the option to resume the chat at a later time.

Deleting chat history: As for SMS today, it *should* be possible for a user to delete single or multiple messages within a chat thread or the whole thread with a specific contact.

Copy/Paste: It may be possible to copy/paste messages from chat history.

Forwarding messages or conversation history:

- It *should* be possible to forward the text of a message (either sent or received) via joyn. Only the text and no information on original sender and time *will* be forwarded. It *may* also be possible to copy the text.
- It *should* also be possible to export an entire conversation (1-2-1 or Group Chat) in plain text format and send it as a file via the available sharing methods (e.g. email, joyn). Only plain text will be exported; files or geolocations will not be exported. The used format is left to the implementation and no import of exported conversations is required.

Loss of connectivity: Two cases are possible[25]:

- Sender not connected: The user *shall* be informed that they are currently not connected to the service and that the messages they write are pending and *will* be sent as soon as their connectivity is restored.
- Recipient not connected: When a message is sent and stored in the network waiting for the recipient to reconnect, the user *will* be aware of the situation by not receiving delivery notifications for the messages they send.

Handling multiple simultaneous conversations: The joyn application *shall* support multiple conversations at the same time and provide an intuitive, easy and quick way to move between different Chat sessions. The user *should* be able to quickly identify Chat sessions that contain unread messages.

---

[25] This applies to the "converged inbox" approach, whilst more detail on how to communicate to the user the status of their messages is provided in the "fully integrated" approach definition (4.1.4.1)

5.1.3.1 Emoticons

The Chat composer *must* offer the user emoticons.

Joyn blackbird implementations shall support two sets of emoticons:

- RCS-e 1.2.2r Hot Fixes emoticons: these emoticons are specific character sequences that must be replaced with a graphic when a message is displayed in the messaging thread, or any notifications that represents the message or parts thereof. The list of these emoticons is in chapter 14.1
- Emoji: The Unicode standard does not require a combination of characters or symbols to generate an emoticon graphic rather that the user opens the emoticon library and manually selects an emoticon for sending. On sending, a unique code is passed to render correctly on the receiving contacts device. All joyn Blackbird implementations must support the full set of Emoji. The list of applicable Unicode Blocks is in chapter 14.2

OEMs can implement the emoticon menu option as they wish, but consumer feedback suggests that users prefer to select multiple emoticons within an emoticon menu rather than selecting one, jumping back to the composer and having to reopen the emoticon menu before selecting another emoticon.

The joyn Hot Fixes emoticons should be prioritised in order of selection when opening the emoticon gallery, with the Unicode emoticons being secondary, the OEM may choose to implement 'Recent' selections tab for ease of access of popular choices.

OEMs may choose to design their own graphics for each individual code provided in Annex Section 14.

5.1.4   Notifications and appearance

Incoming message notifications: These *shall* follow the same approach used for native SMS notifications in all relevant touch points. Yet considering the distinctive peculiarities of instant messaging e.g. the expected higher number and frequency of messages, adherence to some of the following best practices is *recommended*:

- Aggregation of notifications for multiple messages in the same conversation.
- Display a counter of unread messages in a specific conversation in all relevant touch points (i.e. notifications, conversation list, and contact card).
- Silence notifications for events in rapid sequence.

Message display: Visualisation of messages *shall* once again follow the device or client vendor UI principles for core communications; however it is best practice that the sender is easily identifiable while looking at a thread (e.g. by displaying the message next to the contact picture).

Message Ringtone: It may be possible to customize a ringtone for incoming chat messages.

Aggregation of consecutive messages: To improve the visual experience, consecutive messages from a contact sent in a short timeframe could be grouped within the same visual

element that is adopted to delimit messages from different users (e.g. a message bubble or a section delimited by a horizontal line). Message status information *will* refer to the last message. In the case where fully integrated messaging has been implemented, the aggregation may consist of xMS, chats and files.

5.2   Interaction with other features

The 1-to-1 chat provides the context for the initiation and delivery of the File Transfer, section7, Contact Share, section **Error! Reference source not found.**, and Location Share, section **Error! Reference source not found.** use cases. Such services *may* be grouped behind a generic "share" entry point which *shall* be visible in the main composing interface similarly to Emoticons.

The description of such features in detail is deferred to the specific chapters. No relevant interdependencies are expected.

5.2.1   1-to-1 chat across multiple devices

For users that have joyn enabled on multiple devices sharing the same identity, the expected behaviour of 1-to-1 chat is as follows.

Receiver has multiple devices:

- **Initial message(s) delivered to all online devices:** A chat invitation is the message that initiates a new chat session and in general we can say that an invite *will* be sent whenever sending a message to a user outside the context of an active chat exchange (inactivity being the cause of expiration of active sessions). There *may* be multiple invites which need all to be delivered to all connected devices until there is user interaction on one of them.
- **"Acceptance" of the first chat invite:** Any user interaction upon receipt of a chat invite, that is matching the criterion defined by certain parameters[26], *will* trigger the establishment of a session dedicated to that specific device. From that moment on, messages *will* be delivered only on the "active" device.
- **Inviting an offline user:** Because of the chat store and forward feature, chat invites can be stored due to recipient offline with all devices. Such messages *shall* be delivered as soon as any of the recipient's devices become online. However, even if invites are unanswered, once they have been delivered to one device, they *will* not be delivered to further recipient's devices which *may* become available at a later time.
- **Message history:** Except for invite messages which reach all online devices, history of the in session messages *shall* be saved at least on the device where the conversation takes place. New messages are displayed in the same thread as any previous message exchanged with a specific contact even if the contact is sending messages from different devices. Chat usage in multi-device scenarios *will* likely generate breaks in the continuity of a message thread, due to the fact that history *will* be split across different devices. With this in mind, any UI expedient aimed at

---

[26] IM SESSION START and IM SESSION AUTO ACCEPT

highlighting that there is a relevant gap in time between new messages and previous messages is considered highly beneficial.

- **Switching to another device during a chat:** It *shall* be possible to switch to a different device while in a chat. However, due to the limitation of not having the history synched, this case equals to starting a new chat from another device (see below).

Sender has multiple devices:

- **Chat can be started from any of a user's devices:** The same entry points for starting a chat defined in the general section above, apply in a multi-device scenario. The user *will* have to identify the contact in the address book or any logs or, alternatively, identify a previous conversation with the contact and post a reply. Starting a chat from a specific device *will* leave no trace on the other devices of the user. (I.e. messages sent *will* not be visible on any other device).
- **Replies to a message sent from a specific device:** These *shall* only be received on that specific device. An exception to this case exists when the reply happens after the (technical) expiration time for an invite message. In such cases, the reply becomes a new invitation and follows the Receiver, section 0, experience.
- **Delivery notifications:** When the sender has multiple devices the delivery notifications *shall* only be displayed on the device that originally sent the message.

5.2.2   1-to-1 chat while in a call

An entry point to joyn chat *shall* be placed in the calling screen when calling a joyn contact. When initiated from a call, the chat screen should allow the user to easily return to the active call and should appear differently to a chat initiated from a contact or the chat application. A chat screen initiated from a call may be presented as a popup window on top of the calling screen which can be then closed (or expanded).

5.3   Technical implementation

5.3.1   Specification References

1-to-1 chat *shall* be realised as described in sections 2.7.1 and 3.3 of [RCC.07 RCS 5.1] and its subsections. Following functionality described in section 3.3 of [RCC.07 RCS 5.1] is not part of joyn Blackbird:

- Interworking of Chat to SMS/MMS. Section 3.3.4.1.6 of [RCC.07 RCS 5.1] is thus not applicable for joyn Blackbird.
- Personal Network Black List. Section 3.3.4.1.2 of [RCC.07 RCS 5.1] is thus not applicable for joyn Blackbird.
- Network Based Common Message Store.
- Inclusion of multimedia messages in the Chat.
- Switching of a 1-to-1 to a Group Chat.

For joyn Blackbird, the 1-to-1 Chat *will* be based on OMA SIMPLE IM. Section 3.3.4.3 of [RCC.07 RCS 5.1] is thus not applicable for joyn Blackbird.

5.3.2 Configuration Parameters

Following configuration parameters defined in Annex A of [RCC.07 RCS 5.1] are specific to the 1-to-1 Chat. For Blackbird they *will* be handled as follows:

Configuration parameter	Blackbird handling
PRES-SRV-CAP	Fixed Value: 0 Indicate that the Messaging server won't publish on behalf of the client
CONV-HIST-FUNC-URI	Fixed value: populated with sip:foo@bar as defined in [RCC.07 RCS 5.1]
DEFERRED-MSG-FUNC-URI / MSG-STORE-URI	Fixed value: populated with sip:foo@bar as defined in [RCC.07 RCS 5.1]
DELETE-URI	Fixed value: populated with sip:foo@bar as defined in [RCC.07 RCS 5.1]
CHAT AUTH	Fixed Value: 1 Chat is always enabled for joyn NOTE: when receiving a provisioning document from a legacy network, this parameter is provided in the IM characteristic instead of in the SERVICES characteristic. In that case, Chat shall be enabled, but the client shall not request delivery and display notifications in a Group Chat.
IM CAP ALWAYS ON	Service Provider Configurable Note: Store and Forward will always be provided, but a Service Provider may prefer that clients fall back to legacy messaging in case the user is offline.
IM WARN SF	Service Provider Configurable
IM CAP NON RCS	Fixed Value: 0 Interworking is not provided NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. A value of 0 shall be assumed in this case.
IM WARN IW	Not applicable: as IM CAP NON RCS is set to 0 the parameter is *optional* and won't be provided
IM SMS FALLBACK AUTH	Service Provider Configurable
IM SESSION AUTO ACCEPT	Service Provider Configurable
IM SESSION START	Service Provider Configurable
FIRST MSG IN INVITE	Fixed Value: 1 A message *shall* always be included in the INVITE request for joyn NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. A value of 1 shall be assumed in this case.

Configuration parameter	Blackbird handling
IM SESSION TIMER	Service Provider Configurable. The value *shall* be large enough to ensure that the session is cleared from the network first.
MAX CONCURRENT SESSIONS	Service Provider Configurable NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. A reasonable number of sessions shall be allowed in this case.
MULTIMEDIA IN CHAT	Fixed Value: 0 No multimedia *shall* be included in the Chat messages for joyn. It *will* be sent in a File Transfer request instead NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. A value of 0 shall be assumed in this case.
MAX SIZE 1-to-1 IM	Service Provider Configurable
MESSAGE STORE URL	Not Provided: the message store is not included in joyn Blackbird
MESSAGE STORE USER / PASSWORD	Not Provided: the message store is not included in joyn Blackbird
MESSAGE STORE AUTH	Not Provided: the message store is not included in joyn Blackbird
CHAT MESSAGING TECHNOLOGY	Fixed Value: 0 joyn *shall* use OMA SIMPLE IM for Chat NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. A value of 0 shall be assumed in this case.

Table 28 **: Blackbird 1-to-1 Chat configuration parameters**

5.3.3   joyn Blackbird specific technical behaviour

5.3.3.1 Reason Headers in CANCEL

When receiving a SIP CANCEL request carrying a Reason header field with the protocol set to SIP and the protocol_cause set to 200, a joyn Blackbird client shall use this information to indicate that the chat was continued on another device.

5.3.4   Implementation Guidelines

5.3.4.1 IM 1-to-1 States (Clarification)

The following states associated to a 1-to-1 IM messages correspond to the states defined at UX level (see section 5.1.35.1):

- **Pending**: When the user presses ENTER to send the message until the first provisional response is received. The message may be in this state for some time when the user is NOT registered with the IMS core (e.g. offline or airplane mode).
- **Sent**: a first SIP provisional response is received from the network if the message is sent as part of the INVITE or a MSRP 200 OK is received in case the message was sent over MSRP.

- **Error**: When an error different from 486/487 is received.
- **Delivered**: When receiving the delivery notification.
- **Read**: When receiving the displayed notification.

5.3.4.2 Network time for chat (Recommendation)

As stated in section 3.3.4.1 of the [RCC.07 RCS 5.1], the network will insert the correct time into the messages. For sent messages however the only clock available at transmission time is the device's own clock.

It is responsibility of the Messaging Server to deliver messages in the correct order, so the joyn Client is able to rely on the reception time in order to interleave the incoming and outgoing messages. Please note that the ordering of the messages is phone clock based, the shown message time at the UX shall be the network time (when available) in order to correctly display the time of store and forwarded messages.

5.3.4.3 CPIM formatting (Recommendation)

In order to favour the interoperability, the clients shall follow the RFC 3862 and RFC 5438 but also be flexible enough to handle minor deviations that other clients/handsets may implement. As a reference, we are providing the following recommendations:

- RFC 4975 says that content-Type for message/cpim is case insensitive. To maximize interoperability we recommend the message type is set to "message/cpim" all in lowercase characters. Please note this is also applicable in all those other cases in RCS where there is a SDP negotiation; the type is always coded in lowercase characters.
- Please note the following example is intentionally missing the IMDN disposition notification. Together with the message, we are including some comments marked in red:

---

m: Content-type: message/cpim (note that if this is part of a multipart, this will include a Content-Length header after Content-Type. If not, and it is included already at SIP level it is ok)

s: (A blank line in the end can be optional, however we still recommend including it)

h: From: MR SANDERS <im:piglet@100akerwood.com>

h: To: Depressed Donkey <im:eeyore@100akerwood.com>

h: DateTime: 2000-12-13T13:40:00-08:00

h: Subject: the weather will be fine today

h: Subject: lang=fr beau temps prevu pour aujourd'hui

h: NS: MyFeatures <mid:MessageFeatures@id.foo.com>

h: Require: MyFeatures.VitalMessageOption

h: MyFeatures.VitalMessageOption: Confirmation-requested

h: MyFeatures.WackyMessageOption: Use-silly-font (Content-length for full body can be added)

s:(again the blank line can be optional however we still recommend including it)

e: Content-type: text/xml; charset=utf-8 (charset=utf-8 optional of course, however this encoding is recommended to favour interoperability across different language regions)

Table 29: RFC 3862 recommendations for interoperability

- Please note the following example is focusing on the IMDN disposition and therefore, it covers only a fragment inside RFC 5438. Content-type: Message/CPIM is missing, but it should be there as the above example and then a final blank line as recommended. Together with the message, we are including some comments marked in red:

```
From: Alice <im:alice@example.com>
To: Bob <im:bob@example.com>
NS: imdn <urn:ietf:params:imdn>

                                                    imdn.Message-ID: 34jk324j

DateTime: 2006-04-04T12:16:49-05:00
imdn.Disposition-Notification: positive-delivery, negative-delivery (", delivery" here is compulsory)
(blank space needed as per RFC 5438 rectification http://www.rfc-editor.org/errata_search.php?rfc=5438)
Content-type: text/plain (here for example this is part of the body, but the blank line is missing)
```

: RFC 5438 recommendations for interoperability (1/2)

Table 30

- As a fragment inside the RFC, Content-type: Message/CPIM is missing, but it should be there as the example from 3862 and then a blank line, if included at SIP level it is ok.

```
From: Bob <im:bob@example.com>
To: Alice <im:alice@example.com>
NS: imdn <urn:ietf:params:imdn>
imdn.Message-ID: d834jied93rf
(blank space needed as per RFC 5438 rectification http://www.rfc-editor.org/errata_search.php?rfc=5438)
Content-type: message/imdn+xml  (here for example this is part of the body, but the blank line is missing compared to RFC3862)
Content-Disposition: notification
Content-length: ...
(This blank line between body headers is compulsory to know where the body content starts)
<?xml version="1.0" encoding="UTF-8"?>
<imdn xmlns="urn:ietf:params:xml:ns:imdn">
        <message-id>34jk324j</message-id>
        <datetime>2008-04-04T12:16:49-05:00</datetime>
        <recipient-uri>im:bob@example.com</recipient-uri>
        <original-recipient-uri
```

Table 31

: RFC 5438 recommendations for interoperability (2/2)

5.3.4.4   1-to-1 to group chat extension (Clarification)

The extension of a 1-to-1 chat to a group chat is not used. Instead when starting a group chat from a 1-to-1 chat window, a complete independent group chat shall be created.

That is, there is no difference between creating a new group chat and extending a 1-to-1 chat to a group chat.

5.3.4.5 INVITEs frequency within S&F procedures (Recommendation)

In the flow in section B.1.3 of [RCC.07 RCS 5.1] when User B comes back online the flow shows the server as sending an INVITE for each message stored. The client sends a 180 Ringing for each and when the server sends another INVITE (for the next stored message), the client sends a 180 in response to that INVITE plus a 486 in response to the previous INVITE.

When the store and forward is provided by the terminating network the Instant Messaging (IM) server shall wait for the delivery notification or 180 ringing response of the previously sent message before sending a new message in SIP INVITE request to the same user.

5.3.4.6 1-to-1 chat Store and Forward procedure with different Operators (Clarification)

As the forward action may be initiated from another domain, e.g. as described in section B.1.4 of [RCC.07 RCS 5.1], a client shall only take into account the user portion of the URI received in the P-Asserted-Identity when verifying whether a received SIP INVITE request is for forwarding stored notifications. If the user part of the URI corresponds to 'rcse-standfw', the domain part shall therefore be ignored.

5.4   Other considerations

The joyn Blackbird chat solution and experience is fully backward compatible with the joyn Hotfixes [Hot Fixes] solution hence no legacy use cases are foreseen.

6   Group Chat

6.1   User Experience for Group Chat

The joyn service allows the user to have conversations with multiple participants through the Group Chat functionality. Once the user creates a Group Chat (i.e. there are more than two participants listed in the chat) and if this user does not leave this Group Chat, then that Group Chat remains permanently as a conversation on the user's device and the user can resume the Group Chat at any time without having to re-select the Group Chat participants.

Group Chat Store and Forward functionality can be seamlessly introduced in Blackbird networks, therefore, when this functionality is deployed, any participant in a Group Chat registered in a Blackbird network will receive all the messages sent to the group, regardless of its connectivity status and regardless of the device RCS version. For the interim period, the user experience described below mitigates and masks the limitations, however, giving enough transparency for the users to understand the service logic.

6.1.1   Sender's experience

Entry points for a Group Chat: entry points to joyn chat depend on the approach to integration of messaging defined by the MNO. For the Integrated Messaging approach refer to 4.1.2.

Service availability: Only users that have been already discovered as joyn enabled can be part of a Group Chat. A contact can be added to the Group Chat regardless of their online/offline status.

Two cases can be found:
- Users belonging to MNOs that have not deployed store&forward functionality: only those that are connected to the joyn service at the moment of the invitation will be able to join the chat. After a contact is added, it will appear in the local Group Chat participants list of the sender, (and, in some particular cases, of all the other participants) therefore, throughout the lifecycle of the Group Chat they *will* be able to join at a later stage due to the restart mechanisms.
- Users belonging to MNOs that have deployed store & forward functionality: Will be able to join any time, given that all messages would be stored when the user is offline and forwarded when the user is back online.

Defining a subject: It *shall* be possible to define a subject for the Group Chat to make it easily recognisable in the conversation history. However, there is no uniqueness requirement for this value (multiple Group Chats can have the same subject and even the same participants).

- Subject is used as a header in the conversation view, and also as the name of the Group Chat in the Chat list view.
- If nothing is written as Subject by the Group Chat creator, the field *will* either remain empty and from a user experience perspective, a client implementation *shall* use the list of participants as a local identifier of the Group chat in the list of conversations and the chat window header *or* the Group chat subject field is automatically populated (e.g. Group Chat 1, Group Chat 2). This subject title will carry no user data.
- The subject field *shall* have a length of at most 50 characters. Spaces and all characters supported in chat *shall* also be supported in the 'subject'.
- If emoticons (i.e. the correspondent strings) are added in the subject field, these *may* be parsed and displayed as picture in the chat heading.

6.1.2   Receiver's experience

Joining a Group Chat: No explicit acceptance of a Group Chat invitation is needed. When receiving a Group Chat message, a notification *shall* be displayed according to the notification principles for core communication services of the device. Opening the notification *shall* lead to the conversation thread where the message belongs and allow the receiver to view all messages exchanged in the Group Chat, since the first message has been received by the user's device and automatically accepted. This decouples the establishment of a Group Chat session from the user's actual interaction.

Receiver offline:

- Users belonging to MNOs that have deployed store&forward functionality: If at the time a chat session is initiated, one of those users is not connected to the joyn service, the first message that initiates the chat session will be stored until the user reconnects to the joyn

service. At the point that user reconnects, that message and all other messages that may have been sent to the group will be delivered to the user.

NOTE: This scenario also applies to the case in which a joyn Blackbird device interoperates with Legacy devices/networks not supporting the group chat store&forward functionality defined in joyn Blackbird. In such a case, if the device does not receive the first message that creates the group before it technically expires, they *will* not join the active session, but *shall* still be kept in the participant lists of the joyn Blackbird (and Legacy) devices.

- Users belonging to MNOs that have not deployed store&forward functionality: there are no means for the user to be aware that a conversation is on-going. If the user was part of a previous instance of such conversation, they would still have a chance to join the active thread by posting a reply from the history of such conversation. In any case, because such user is part of the participants' list of the other members of the Group Chat, they *will* be able to receive a new invitation every time a new session is initiated (at protocol level, transparently for the end user) i.e. after a period of inactivity of the conversation.

Muting Group Chat Notifications: If a user has been added to a group chat but wishes to not open and read messages straight away, they can choose to mute group notifications, both audibly and visually, with an option to silent all group chat messages apart from the first notification of the invite to a group chat.

6.1.3   In-chat experience: information on participants

Current participants' visual list: A user *shall* be able to easily see a list of the current participants to the chat; this *should* be without leaving the chat window.

- Information about participants *shall* be shown prominently (e.g. in the heading of the Group Chat conversation view). The information displayed *shall* include the number of participants in the Group Chat, ideally detailing the number of active and inactive (offline) users. Graphical expedients like contact ordering/grouping, colour coding etc. to visually distinguish active and inactive users are considered highly beneficial, the list of participants will not include the user's own name.

- A detailed view of the participants; presenting full names, pictures (saved for the contact in the address book) and status indication (active or inactive) *should* also be available to allow the user to easily check who they are talking to. This is particularly important when the number of participants is high and they cannot all be shown in the quick view. The detailed view *shall* be consistent with the conventions adopted in the quick view.

Participants' status: An indication of a user's online/offline status *shall* be displayed along with the participants list to give a more immediate view on which of the participants are currently receiving messages (as opposed to those who are offline for whom messages are not currently being delivered, and possibly, in the case of no MNO store and forward, even lost).Precisely:

- **Active:** Means that the participant is receiving all the messages sent to the group. The status *will* be 'active' if the user has an active session with the messaging server which is hosting the Group Chat, or if the user belongs to a MNO that has deployed store&forward functionality.

- **Inactive:** Can apply only to users that belong to a MNO that has not deployed store&forward functionality. Means that currently the participant is not receiving any messages sent to the group. The status *will* be 'inactive' if an invitation times out (e.g. user offline) or if the user doesn't currently have an active session with the messaging server (typically user offline or user missed the invite for current session).

Adding participants: Any participant to the Group Chat *shall* be able to easily add further participants in a natural manner. Users can be added regardless of their connection state (online/offline).

- If there is a maximum number of participants for a Group Chat (configurable by each MNO), then this limit *shall* be presented to the end user. It is suggested that this limit *may* be visibly present every time the user selects or adds users to a chat session, in either 1-to-1 or Group Chat sessions.

In case that various interworking operators are involved in one group chat session, the limit of the operator hosting the group chat shall apply.

Notification of participants joining/leaving the chat: Notifications within the chat thread *shall* only be displayed when:

- A new participant has joined (i.e. becomes part of the participant list);
- A participant has manually left the conversation;
- No notifications *shall* be displayed when a user changes offline/online status, simply their status *shall* be updated in the participants list

Leaving a Group Chat conversation: Two different methods can be distinguished upon user interaction:

- **Minimizing the group chat on the device:** Meaning that the customer closes the chat application either by manual interaction (e.g. by selection of another joyn function, pressing the 'home' key or switch to another application) or phone interaction (e.g. incoming call). In this case, the user shall stay in the group, continue to listen to incoming new messages and resume at any point in time. The other participants shall not be notified about this user interaction.
- **Leaving the group chat** (e.g. by the user pressing the "leave" button in the group chat application) terminates their participation in this particular group chat. The group chat thread shall still be accessible, but any future messages will not be added in this thread and there is no way for the user to send any more messages to this group chat. The other parties *shall* be notified of the exit and notification or messages originating from that Group Chat *shall not* reach the user any longer. A user who willingly leaves a Group Chat *shall* not be able to re-join it unless re-added by an existing participant. Therefore it is *recommended* that the composing field is disabled

after such action and the history "locked", however the message history remains visible.

Loss of connectivity:

Users belonging to MNOs that have deployed store&forward functionality: If loss of connectivity causes a user to drop out from a Group Chat, no notifications *shall* be presented in line with messages to the other participants. When connectivity is restored, the user's device *shall* receive all the messages that may have been sent to the group during its disconnection,

Users belonging to MNOs that have not deployed store&forward functionality: If loss of connectivity causes a user to drop out from a Group Chat, the availability of the user in the other participants' participant list *shall* be updated to 'inactive'. However, in accordance with the notifications described above, no notifications *shall* be presented in line with messages to the other participants. When connectivity is restored, the user's device *shall* try to re-join any on-going session. If successful, the user availability *shall* be updated in the other participants' participant list and no notifications *shall* be presented in line with messages.

Participants' differentiation: The messages originating from each of the users within a Group Chat window *must* be easily distinguishable from the remaining participants, e.g. by using a different background colour for each user's messages and/or by displaying the contact name and/or picture next to their messages.

6.1.4   In-chat experience: messages and conversation history

Continuity and persistence of the Group Chat: From a user perspective, a Group Chat *shall* be a permanent experience in the sense that at any time:

- The user *shall* be able to initiate a chat with their joyn enabled contacts.
- The user *shall* be able to access the conversation history and send a new message to the group (except for "Leaving a Group Chat" case) without the need for re-selecting the participants.
- All messages sent in the context of a Group Chat *must* be presented in a unique history thread.
- Even if the initiator of the group chat leaves the session, the group chat will not terminate, allowing other members to continue the chat.
- If only one participant remains in the chat, he should be notified that the group chat will be terminated and the reason for this

Messages exchanged while a user is not connected:

Users belonging to MNOs that have deployed store&forward functionality: All messages exchanged when a user involuntarily disconnects from an on-going chat session *shall* be stored until the user reconnects.

Immediately after connectivity is restored, all stored messages from each session will be delivered to the user's device and then removed from the Group Chat server.

Every attempt to send a new message within the conversation *will* trigger a re-join request. This activity *shall* be transparent to the user.

Users belonging to MNOs that have not deployed store&forward functionality: Due to the absence of a function able to store messages exchanged when a user involuntarily disconnects from an on-going chat session, messages exchanged will go lost A client implementation *must* minimize the effects of such limitation by implementing policies for automatic and user driven re-join (re-connection):

* Immediately after connectivity is restored, the user's device *shall* silently try to re-join all Group Chat sessions that were active at the time the disconnection event happened.

* Every attempt to send a new message within the conversation *will* trigger a re-join request. In case this fails, the message *shall* be sent as a new invite (restart).This activity *shall* be transparent to the user.

Delivery/display notifications: Unlike1-to-1 chat, see 5.1.3 above, displayed notifications *will not* be offered, and only delivered notifications will be, to ensure that a user is aware of which participants have received each message that such user has sent to the group; that is, these delivery notifications don't apply to messages sent by other users. However, to avoid clutter in the conversation window, this information *may* require user interaction in order to be displayed. A confirmation icon could be displayed when all recipients have received the messages and a clickable progress icon *may* be displayed when there are different states. Upon user selection, a popup can be shown giving detailed information on the status of that particular message for each participant (following 1-to-1 chat notification principles

* Interaction with legacy: depending on the joyn version supported by both networks and clients involved in a group chat, delivery notification *may not* be available throughout the lifetime of a group chat. This can happen either when a network is not joyn Blackbird ready, or when a user's client is not joyn ready.

    When it is a network limitation (identified as described in section 6.3.4.1), the detailed message status screen *shall* display an informative text e.g. "message delivery notifications currently not available".

"Is typing" notifications: An indication *shall* be displayed when users in a Group Chat start typing. Multiple notifications *should* be combined into a single one (for example "2 people are typing").

UI management of network expired sessions: A Group Chat expires in the network when there is no activity in it for a few minutes. However, when this happens, the device *shall* hide this network limitation from the user and simulate the experience of a permanent Group Chat, showing the conversation in the Chat history and allowing any subsequent continuation. The following solution *shall* be implemented:

* Session related information is not shown to the user, i.e. 'Chat closed' *shall* not be displayed at the UI level.

- Simply writing a new message and hitting 'Send' *will* be enough to continue a Group Chat that has timed out at network level.

  - When the user hits 'Send' the Group Chat session is set up and the user message is also sent.
  - When a Group Chat is restarted, no notifications of users joining *shall* be displayed for participants that were already part of the local participant list. The Group Chat header *will* show if any participant is unavailable and *will* give access to details of active participants.
  - Group Chat follows up in the same Chat window, keeping the full history of the session.

- While the Chat is closed at network level, the 'Participants list' *should* still be expandable in order for the user to be able to see the recipients of their new message. However, all participants *may* be marked as inactive where there is no information on their availability.
- **UI management of duplication:** If a client receives multiple messages for the same Group Chat identifier, the UI *must* hide this from the user and apply all the appropriate policies for de-duplication and consolidation of the list of participants (as described in the technical implementation section 6.3) in a way that is totally transparent for the user. The user *shall* only see messages flowing in their conversation thread and the appropriate notifications on the participants.

6.1.5 Notifications and appearance

The same considerations made for 1-to-1 chat in terms of message appearance and notifications also apply to Group Chat, see 5.1.3 above.

New group chat notification shall display the group chat name; the name of the initiator of the group chat may be displayed as well.

6.2   Interaction with other features

The Group Chat provides the context for the initiation and delivery of the Content Sharing (File Transfer, Contact Share and Location Share) to multiple users use cases. Such services *may* be either initiated from the content, in which case a group chat context *shall* be created ad hoc for the purpose, or from an existing conversation, in which case they *may* be grouped behind a generic "attach" entry point which *shall* be visible in the main composing interface similarly to Emoticons.

The description of such features in detail is deferred to the specific chapters.

Group Chat across multiple devices: The Group Chat functionality *shall* only be activated on one device (typically the main device). See section 2.3.5.4.2 above for more information on main devices.

6.3   Technical implementation

6.3.1   Specification References

Group Chat *shall* in joyn Blackbird be realised as described in section 3.4 of [RCC.07 RCS 5.1]. Following functionality *shall* not be part of joyn Blackbird though:

- Interworking of the Group Chat to SMS/MMS. Section 3.4.4.1.6 of [RCC.07 RCS 5.1] is thus not applicable for joyn Blackbird.
- Network Based Common Message Store.
- Basic Store and Forward. Section 3.4.4.3 of [RCC.07 RCS 5.1] and its subsections are thus not applicable for joyn Blackbird.
- Full Store and Forward: section 3.4.4.4 of [RCC.07 RCS 5.1] and its subsections are thus not applicable for joyn Blackbird.
- Starting Closed Group Chats. Section 3.4.6.1.8 of [RCC.07 RCS 5.1] is thus not applicable for joyn Blackbird.
  When invited to a Closed Group Chat joyn Blackbird clients *shall* not offer the user the option to add participants and when restarting that Chat, the client *shall* indicate that it is a Closed Group Chat.
- Sending of Multimedia Messages within a Group Chat, File Transfer based on HTTP *will* be used instead.
- Re-joining a Group Chat after having left explicitly on user request.
- Multi-device handling: Group Chat *shall* only be available on the user's primary device. Therefore only the paragraphs on addressing of section 3.4.4.1.8 of [RCC.07 RCS 5.1] are applicable for joyn Blackbird.
- For joyn Blackbird, the local policy in section 3.4.4.1.3 of [RCC.07 RCS 5.1] shall be to keep the session open when the initiator leaves.

joyn Blackbird clients *shall* be prepared to enable Full Store and Forward though as described in section 2.6.3.4 of [RCC.07 RCS 5.1].

The joyn Blackbird Group Chat *shall* base on OMA SIMPLE IM.

NOTE: Subject to interworking agreements, in joyn Blackbird, the focus *may* keep the focus Session Identity when closing the chat because it is idle. It *may* thus be possible for participants to restart the chat using the same focus.

6.3.2   Configuration Parameters

Following configuration parameters defined in Annex A of [RCC.07 RCS 5.1] are specific to the Group Chat. For Blackbird they *will* be handled as follows:

Configuration parameter	Description
PRES-SRV-CAP	See section 5.3.2
MAX_AD-HOC_GROUP_SIZE	Service Provider Configurable

Configuration parameter	Description
CONF-FCTY-URI	Service Provider Configurable, not set on devices other than the main device.
CONV-HIST-FUNC-URI	See section 5.3.2
CHAT AUTH	See section 5.3.2
GROUP CHAT AUTH	Service Provider Configurable, not set on devices other than the main device.
GROUP CHAT FULL STORE FORWARD	Fixed Value: 0 Full Store and Forward is not included in joyn Blackbird. joyn Blackbird clients shall be able to handle a value of 1 though when the network introduces this functionality. NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. A value of 0 shall be assumed in this case.
GROUP CHAT INVITE ONLY FULL STORE FORWARD	Fixed Value: 0 All users may be invited for a Group Chat NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. A value of 0 shall be assumed in this case.
IM CAP NON RCS	See section 5.3.2
IM WARN IW	See section 5.3.2
IM SESSION START	See section 5.3.2
IM SESSION AUTO ACCEPT GROUP CHAT	Fixed value: 1 on primary devices, 0 on secondary devices Group chat is disabled on secondary device. So primary devices can use auto accept
MAX CONCURRENT SESSIONS	See section 5.3.2
MULTIMEDIA IN CHAT	See section 5.3.2
MAX SIZE GROUP IM	Service Provider Configurable
MESSAGE STORE URL	See section 5.3.2
MESSAGE STORE USER / PASSWORD	See section 5.3.2
MESSAGE STORE AUTH **Table 32**	See section 5.3.2
CHAT MESSAGING TECHNOLOGY	See section 5.3.2

: Blackbird Group Chat configuration parameters

6.3.3   Changes relevant to RCS 5.1

6.3.3.1 Leaving a Group Chat that is idle

In case the user expresses their desire to leave the Group Chat while it is inactive, the device will not offer the user the possibility any more to enter new messages and restart the chat and automatically decline the first incoming INVITE request for the chat with a SIP 603 DECLINE response.

Subsequent INVITE requests should not be rejected as they may be received when the user is added again to the Chat by one of the participants.

6.3.4   joyn Blackbird specific technical behaviour

6.3.4.1 Delivery and Display Notifications towards legacy clients and networks

To realize the behaviour described in section 0, the controlling and participating functions of a joyn Blackbird Messaging Server *will* identify that a party in the chat is not capable of generating IMDN Disposition notifications by the fact that that party did not include the MIME type for IMDN (*message/imdn+xml)* in the a=accept-wrapped-types attribute in the SDP when setting up the session and that it included the File Transfer via HTTP IARI tag in the contact header during the setup of the Group Chat (see section 3.5.4.8 of [RCC.07 RCS 5.1]). In that case the Messaging Server *will* generate delivery notifications itself (e.g. on reception of the MSRP 200 OK) as specified in section 3.4.5.2 of [RCC.07 RCS 5.1] and it *will* remove the CPIM/IMDN Disposition-Notification header from the messages that it sends to the clients.

> NOTE: The MIME type for IMDN could either be indicated explicitly in the a=accept-wrapped-types attribute or in case of interaction with a non-joyn network also through a wild card.

Similarly a joyn Blackbird client will detect that either the Conference focus or the local network does not support delivery notifications through the fact that the MIME type for IMDN (*message/imdn+xml)* in the a=accept-wrapped-types attribute was not included in the SDP received when setting up the session or the File Transfer via HTTP IARI tag in the contact header during the setup of the Group Chat (see section 3.5.4.8 of [RCC.07 RCS 5.1]). In that case it will not request disposition notifications in the Group Chat messages that it sends.

6.3.4.2 Group Chat on Secondary devices

As described in section 6.2, devices other than the user's main device (see section 2.3.5.4.2) *shall* in joyn Blackbird not provide Group Chat in order to provide a consistent experience on the main device. To achieve this the GROUP CHAT AUTH parameter defined in section A.1.3.3 of [RCC.07 RCS 5.1] will be set to disable the group chat service.

6.3.5   Implementation Guidelines

6.3.5.1   Chat user selection mechanism and UX (Recommendation)

When starting a group chat from the chat application, there should be a UX interaction/screen allowing the user to choose the participants. The shown list should show all the joyn contacts because without checking with OPTIONS, it is not possible to distinguish whether the users are currently available and performing an OPTIONS query for the whole list will be too time-consuming.

Please also note that if the UX design is such that the screen is both used to start a 1-to-1 (1 user selected) or a group chat, the confirmations should be shown only if two or more users are selected, as a 1-to-1 chat can be set up anyway even the other party is offline.

6.3.5.2   Group chat lifecycle (Clarification)

Consistently with the specification, a Group Chat session will be terminated when the number of active participants (i.e. participants with whom the controlling function has a session established or for which no final response has been received yet on a SIP INVITE request) is less than two. It will continue though when the group chat session initiator leaves the chat.

A Group Chat that was terminated because the number of active participants in the last session was less than two, but for which there still were inactive users on the participant list may be restarted at any time by any of the participants according to the procedures specified in section 6.3.5.6.

A Group Chat session may also be terminated by inactivity, but it may be restarted at any time by any of the participants according to the procedures specified in section 6.3.5.6.

6.3.5.3   Permanent Group Chat (Clarification)

The joyn chat service allows the user to be in a conversation with multiple participants, through a Group Chat functionality that resembles permanent groups. Once a group is created, from a user point of view, it remains available as an operative entity as long as the number of participants keeps above two.

This permanent behaviour is actually built on top of temporary sessions in the network. Since this may require re-establishing the Group session when a member sends a new message it could happen that a participant switches between an 'offline' and an 'online' situation with regards to the Group if he misses any of these re-invitations.

The permanent Group Chat like user experience is achieved by assigning at creation time a globally unique ID to each group chat. This ID will be used as Contribution-ID in the group chat sessions. So, when a client receives an incoming group chat session invitation, it will be able to retrieve the corresponding group chat, if any, based on the value of the Contribution-ID provided in the SIP INVITE request.

When user wants to send a message to a group chat, the client shall check if there is an active group chat having the corresponding Contribution-ID value. If there is no active session, the client shall restart the group chat session as described in section 6.3.5.6.

As store and forward is not yet available there are two main problems that need to be addressed in this short term solution:

- As the users may be offline when a group chat session is restarted, if a new participant is added to the group chat, the user will not be notified about this new participant. So, the list of participants in each local device may not be up to date.
- As the life cycle of the group chat is not controlled by the network yet, it may happen that two group chat sessions with the same Contribution-ID (i.e. belonging to the same group chat) are created simultaneously.

Until both issues are solved on the network side, the clients are requested to implement safeguards to mitigate the above problems.

The solution requires the client to support having different concurrent group chat sessions in parallel associated to the same group chat.

An example flow of the problem and the proposed solution is below:

Figure 10

▬▬▬	Session 1
▬▬▬	Session 2
▪ ▪ ▪	Session 1 (un-prioritized)
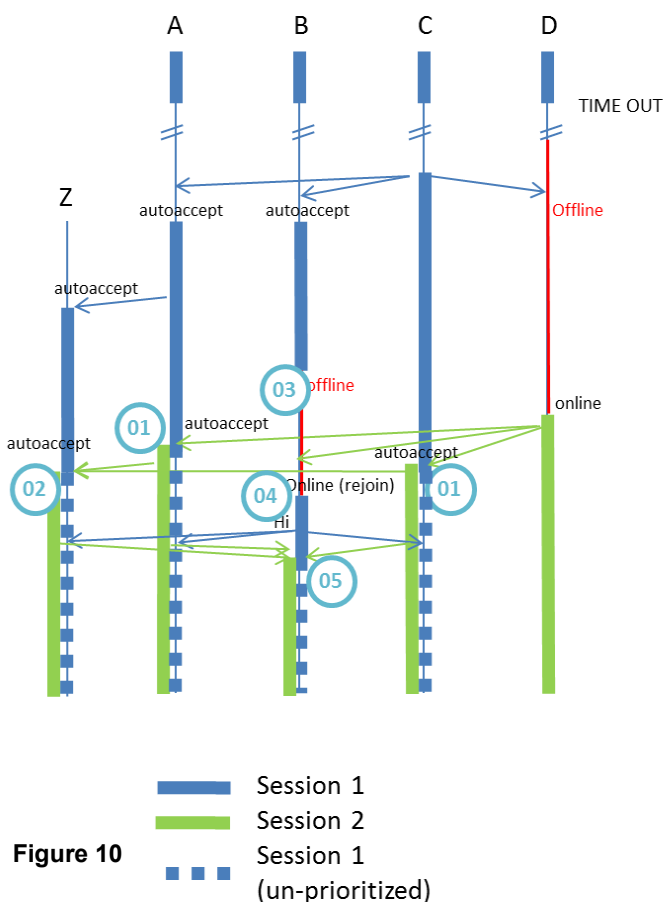
: example group chat concurrency

1. A group chat has already established between A, B, C and D, and C re-starts the group chat by typing a new message.
2. D is offline and therefore missed the invitation and the new group chat session. B goes offline due to connectivity losses.

3. If D becomes online and types a new message to the group chat, it will re-start the group chat by sending a group chat session invitation with the same Contribution-ID.
4. Once A and C user receives a new group chat session with the same Contribution-ID as an already on-going chat session:

   a) They will use newest session (session 2) to send all messages in order to let expire the old one (session 1).
   b) They will invite to session 2 participants of session 1 not already part of session 2 (Participant Z and B).
   c) Because B is offline, he won't accept the invitation, but we make sure all active participants have the new list of participant updated.
   d) B is online again. B will re-join to the active un-prioritized session 1. Write a message.
   e) Z, A and C invite B to session 2. So B also un-prioritized session 1.
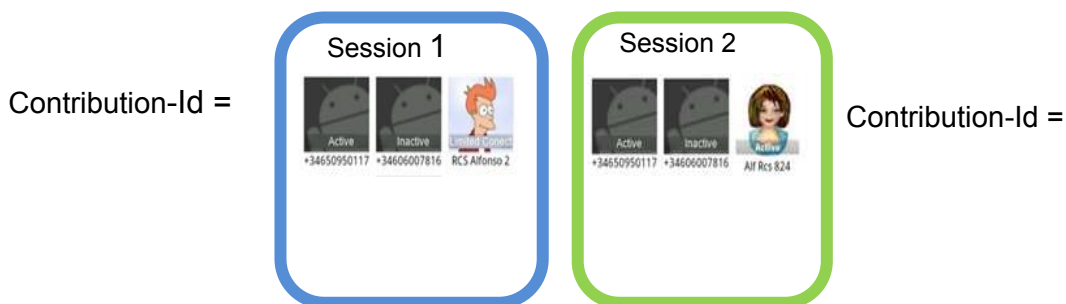
: Group Chat Concurrency approach

6.3.5.4   Group chat initiation (Clarification)

In group chat the INVITE sent by the initiating client shall not contain a first message, neither in the Subject header nor in a CPIM body.

> Note: This does not preclude a group chat INVITE including a real subject in the Subject header.

6.3.5.5   Group chat automatic re-join (Clarification)

When the participant (different to the initiator of the session) leaves a group chat session involuntarily (e.g. loses data connectivity or a handover between PS and Wi-Fi occurs), the client shall implement a mechanism to retry re-joining the chat session once the client is registered again with the IMS core as defined in previous section. This shall be done by sending a re-join request. In case that fails, the client should assume that the Group Chat is idle and no automatic restart of the chat (as described in section 6.3.5.6) should be performed as that procedure should only be started on user request.

6.3.5.6   Group Chat re-start (Clarification)

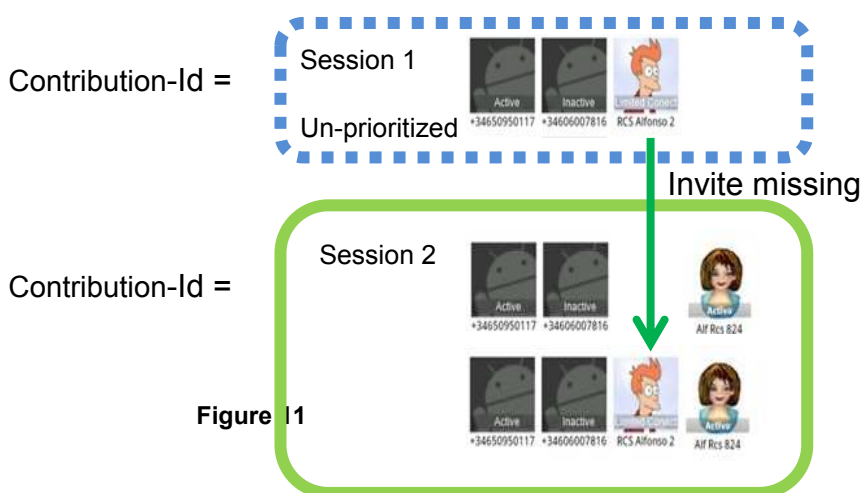When a Group Chat has been closed due to inactivity, it may be restarted at any time by any of the participants. In order to do so, the joyn client will as described in [RCC.07 RCS 5.1] try to re-join using the focus Session Identity and same Contribution-ID of the previous Group Chat session. Depending on Service Provider policies, the Group Chat may (e.g. in later RCS releases) be automatically restarted as explained below or a 404 error response will be returned. If a 404 error response is returned the RCS-e client shall initiate a new Group Chat re-using the same Contribution-ID and with latest participant list it has available for the Group Chat to build the URI-list in the SIP INVITE request. If the client is not authorized to (re-) create a group it will receive a 403 Forbidden error from the Messaging server including the warning text set to '127 Service not authorised' as specified in OMA SIMPLE IM. In that case the RCS-e client shall not create a new group chat with the same Contribution-ID.

It may happen that more than one participant in a Group Chat that was closed because of inactivity will restart the Group Chat at the same time, resulting in two or more conference foci being allocated using the same Contribution-ID. Since rejecting a Group Chat invitation or terminating an on-going Group Chat session with a SIP BYE request is not possible since it would remove the participant from the Group Chat, the joyn client shall as described in [RCC.07 RCS 5.1]:

- If more than one Group Chat invitation is received with the same Contribution-ID, the joyn client shall establish or reject all the invitations according to the normal procedures.
- If a Group Chat invitation is received with the same Contribution-ID of an already established Group Chat, the joyn device will auto accept the new Group Chat session. The participant list contained in the SIP INVITE request has to be compared with the local participant list and if one or more participants are found in the local list and not present in the incoming SIP INVITE request, the joyn client will automatically add those participants to the new Group Chat.

- The joyn client shall be able to receive all incoming messages from any of the established Group Chat sessions with the same Contribution-ID.
- The joyn client will send messages to the Group Chat using only the latest established Group Chat session with the same Contribution-ID. This will allow the rest of Group Chat sessions to time out due to inactivity.
- If the participant explicitly leaves the Group Chat, all the Group Chat sessions with the same Contribution-ID will be terminated by the joyn client by sending a SIP BYE request.

6.3.5.7 Abandoning a group chat (Clarification)

A user shall be able to voluntarily abandon a group chat. The technical procedure is based in sending a SIP BYE with a Reason Header in all Group Chat sessions set up with the Contribution ID associated with the Group Chat to be abandoned and, consequently, terminating the MSRP session as per standard session termination procedure.

Please note that if a user voluntarily abandons a group chat, no automatic re-join shall be attempted.

6.3.5.8 Re-joining or re-starting a chat that the user has previously abandoned voluntarily (Clarification)

A user who left voluntarily a group chat shall be not able to re-join neither to restart a group chat.

6.3.5.9 Adding participants to a Group Chat (Clarification)

The maximum user participants allowed and the current user count for a running group chat is notified by the focus in the maximum-user-count and user-count elements as defined in [RFC 4575] when the client subscribes to the conference event package. Participants may be added providing the maximum-user-count is not reached and the focus's Service Provider policy allows it. If these values are not present in the conference event package or the group chat is not started (i.e. timed out by inactivity) then the MAX_AD-HOC_GROUP_SIZE configuration parameter may be used instead. For the maximum user count, the joyn client shall take into account both the active and inactive users, but not those that have explicitly left or declined the Chat (see section 6.3.5.11and 6.3.5.12).

When adding participants, as a clarification to [RCS5SIMPLEIMENDORS], the client shall:

- Include an RCS Group Chat ID in the REFER request set to the RCS Group Chat ID of the pertaining Group Chat.
- Include a Subject header in the REFER request set to the pertaining Group Chat subject, if the pertaining Group Chat was created with a subject.

6.3.5.10 Contribution-ID value (Clarification)

The Contribution-ID is required to be a globally unique value. As specified in [RCC.07 RCS 5.1], the value used for the Contribution-ID shall not contain any information that allows identifying the client that generated it (such as an IP Address).

A suggested algorithm for generating the Contribution-ID can be found in
http://tools.ietf.org/id/draft-kaplan-dispatch-session-id-03.txt

6.3.5.11 List of participants (Clarification)

Please note that when restarting a chat the client shall consider the complete list of participants. That includes the complete list of participants which is obtained as part of the INVITE/REFER and any other participant that has been successfully (i.e. he/she has accepted to join the chat) added to the chat.

If a user leaves voluntarily (update on the list of participants), they shall be removed from the list. Note this update is different to the case where a participant times out. This is done by extending the information provided according to OMA SIMPLE IM with additional elements and values defined in [RFC 4575]. More specifically following extensions are provided:

- The "disconnection-method" element can be provided with as values "booted", "departed" and "failed" (see section 6.3.5.12).
- If the "disconnection-method" is set to "failed" (see section 6.3.5.12) also the "disconnection-info" element shall be provided including the "reason" sub-element.

```
…
    </conference-state>
    <users>
        <user entity="tel:+34XXXX" state="partial">
          <endpoint entity="tel:+34XXXX">
              <status>disconnected</status>
              <disconnection-method>departed</disconnection-method>
          </endpoint>
        </user>
    </users>
</conference-info>
…
```

Table 33 : **Content of the SIP NOTIFY when the user leaves voluntarily**

```
…
    </conference-state>
    <users>
        <user entity="tel:+34XXXX" state="partial">
          <endpoint entity="tel:+34XXXX">
              <status>disconnected</status>
              <disconnection-method>booted</disconnection-method>
          </endpoint>
        </user>
    </users>
</conference-info>
…
```

Table 34 : **Content of the SIP NOTIFY when the connection times out**

In the timeout case, the participant is still considered part of the participant list.

Protocol	Method	Request-URI
SIP	NOTIFY	Set to the Contact address that the terminating UE has

		registered. The Contact address is normally expressed as a SIP URI.
Header	**Mandatory/ optional**	**The procedure specific values of the parameter**
Subscription-State	M	Indicates status of the subscription (NOTE 1)
Event	M	Conference
Allow-Event	O	Includes a list of tokens which indicates the event packages supported by the server
Content-Type	M	application/conference-info+xml
Content-Length	M	Specifies length of message body
Message body	**Mandatory/ optional**	**The procedure specific values of the parameter**
Body text	M	The message body SHALL contain the Conference state information. XML schema used for NOTIFY messages is described in IETF RFC 4575 [10].

> NOTE: If the Subscription-State header value is "active", it means that the subscription has been accepted and has been authorized. If the header also contains an "expires" parameter, the UE SHOULD take it as the authoritative subscription duration and adjust accordingly. The header value MAY also be "terminated". The "terminated" value indicates that the UE SHOULD consider the subscription terminated. In such a case, a reason code MAY also be present. IMS-M never sets the Subscription-State header to a "pending" value.

Table 35   **: Signalling parameters: SIP NOTIFY request for Conference event**

Note: Due to the state-of-art IM Application Server design, it is not possible to note participants that have been added to the chat (REFER) who have not yet accepted the chat.

Having said that, there is a workaround that joyn clients are expected to implement. If a user adds another user to the chat that is offline, his client shall add it to its local participant list and has the responsibility to re-invite that added user when the chat is restarted again.

6.3.5.12 Reason Headers in BYE (Clarification)

In order to indicate the reason for the session termination to the network, a joyn Blackbird device *shall* include a Reason Header field in the SIP BYE requests that it sends. This Reason header field *shall* be populated as follows:

- With the protocol set to SIP and the protocol_cause set to 200 e.g. `Reason:` `SIP;cause=200;text="Call completed"`: To indicate that the SIP BYE request was sent because the user left the session voluntarily. When received by the controlling function, the user's status *will* be marked as "disconnected" with the disconnection-method element (defined in [RFC 4575]) set to "departed" in the conference state notifications sent to the remaining participants.
- With the protocol set to SIP and the protocol_cause set to 480 e.g. `Reason:` `SIP;cause=480;text="Bearer Temporary unavailable"`: This Reason header field *shall* be used when clearing idle sessions. When received by the

controlling function, the user's status *will* be marked as "disconnected" with the disconnection method set to "booted" in the conference state notifications sent to the other participants. In normal circumstances that case *should* not occur though.

The Messaging Server *shall* use following Reason headers in the BYE Requests that are generated:

- With the protocol set to SIP and the protocol_cause set to 503 e.g. `Reason: SIP;cause=503;text="Service Unavailable"`: When the session is terminated because the user has lost connectivity. When received by the controlling function, the departed user's status *will* be marked as "disconnected" with the disconnection method set to "booted" in the conference state notifications sent to the other participants.
- With the protocol set to SIP and the protocol_cause set to 480 e.g. `Reason: SIP;cause=480;text="Bearer Temporary unavailable"`: This Reason header field *shall* be used when clearing idle sessions. When received by the controlling function, the user's status *will* be marked as "disconnected" with the disconnection method set to "booted" in the conference state notifications sent to the other participants. In normal circumstances that case *should* not occur though as the idle time should be controlled by the controlling function.
- With the protocol set to SIP and the protocol_cause set to 410 e.g. `Reason: SIP;cause=410;text="Gone"`: When the SIP BYE request is initiated by the controlling function when a participant leaves and it is not *will*ing to host the chat with the number of remaining active participants anymore based on local policy. Since this is originated by the controlling function and the session is terminated to all participants, this has no impact on the conference state notifications. In this case though, the clients shall no longer send a re-join request when restarting the chat (see section 6.3.5.6).

Any BYE request with another value received for the Reason header shall be interpreted by the controlling function as an involuntary departure of the user. In that case, the user's status will be indicated as "disconnected" with the disconnection method set to "booted". The behaviour of the controlling function in case a BYE request is received for a user that doesn't carry a Reason header should be controllable through local policy: the user's status will be marked as "departed" with the disconnection method set to either "booted" or "departed".

6.4   Backward Compatibility

The joyn Blackbird Group Chat solution and experience is backward compatible with the joyn Legacy solution except for when a joyn Blackbird device is in a group chat hosted by a joyn Legacy Network there will be no delivery and displayed notifications.

7   File Transfer

File Transfer (FT) is the ability for users to exchange different types of content (files), during an active session (Chat) or outside an active chat session.

File Transfer is the transfer of any file between joyn users, regardless of file type and size limitation (subject to the maximum file size configured by the MNO).

7.1   1-to-1 File transfer User Experience

7.1.1   Sender's Experience

Entry Points for Sending a File: It *shall* be possible to initiate a File Transfer from all contact related UI touch points across a device, namely:

- **Conversation Thread:** it *shall* be possible to send a file from the chat window/conversation thread with a contact.
- **Gallery/File Browser:** joyn *shall* be among the sharing options offered when a file is selected in gallery or file browser.

Initiation of File Transfer: Depending on the entry point as detailed above, a file transfer can be initiated based on three flows:

- Select Contact → Share → Send File → File Browser → Select File → Preview → Send
- Select Conversation Thread → Share → Send File → File Browser → Select File → Preview → Send
- Select File → Share via joyn → Select Contact from list of joyn enabled Contacts → Confirm Sending.

Sending images: To improve the experience when transferring images, there *will* be the possibility to preview an image and resize it at point of send within the Chat window that gives context to the FT.

- After an image is selected for sharing the user *shall* be given the possibility of resizing it to improve transfer speed.
- The default behaviour *should* be to send a resized image, however the user *may* opt for sending the picture in its full size or for cancelling the image transfer
- A 'don't ask again' option *may* be made available within the popup displayed at point of send.

  - If 'the don't ask again' option is implemented, a related setting *shall* be created in the joyn user settings menu to amend the default choice.

- Image Preview: Once an image file has been selected from gallery/file browser, a preview of the picture *shall* be displayed.
- Resizing options and preview *shall* be shown in the same screen to minimize the number of steps for sending the picture.

Sending video files: To improve the experience when transferring video files, automatic techniques may be applied by the client when sending the file to improve transfer time. There shall be the possibility to resize a video at point of send within the Chat window that the File Transfer belongs to.

- After a video is selected for sharing, if it is at a larger resolution than 480p and the "always ask" option is selected in the joyn settings menu, the user shall be given the possibility of resizing it to improve transfer speed.

  - The default resolution proposed for the resize shall be at 480p encoded at a rate of 1200 kbps however a choice of resizing options at 360p and higher resolutions may also be presented to the user.
  - For each resizing option presented, the user shall be able to see what the resulting file size will be.
  - If the user has selected to "always-resize" in the joyn settings menu, then the resolution selected in this setting shall be applied (Note: default is 480p encoded at 1200 kbps).

- The default behaviour (if the user does nothing but just confirms) should be to propose to resize before sending, however the user may opt for sending the video in its full size or for cancelling the video transfer.
- A 'don't ask again' option may be made available within the popup displayed at the point of send.

  - If the 'don't ask again' option is selected when making his resizing choice, the joyn user settings shall be modified accordingly, with the selected resolution used (if resize has been applied).

- Video clip preview: Once a video file has been selected from the gallery/file browser, a static image preview of the video shall be displayed.
- Resizing options and video preview image shall be shown in the same screen to minimise the number of steps for sending the video.

Recording video in joyn: The client may offer the option to record and send a video within joyn. In this case, by default the client shall record the video at an optimised resolution of 480p at 1200 kbps in order to reduce the transfer time. The user may choose to override this default and record at a different resolution, but this resolution must be at least 360p

File Transfer Progress Bar: When sending a file, the sender *will* be displayed a progress bar that matches with the upload status of the File Transfer from the sender's device to the network.

Large File Management: The sender *shall* be advised every time:

- A file surpasses the MNO transfer size warning (FT WARN SIZE).
- A file surpasses the MNO transfer size limit (MaxSizeFileTr): in such case sending the file *will* not be allowed to be sent.

Cancel File Transfer: The sender *should* have the opportunity to cancel the file transfer during the file transfer process. This is reflected using the file transfer progress bar and cancel option within the display.

Resend File: When a File Transfer is interrupted by sender interaction (or fails), then 'resend button' *shall* be offered to allow the user to re-send the file without selecting a new receiver or selecting the file again.

File Transfer Log: Each File Transfer *shall* be registered in an activity log in the device of the user (for files both sent and received).

7.1.1.1 Blackbird End to End transfer experience

If a sender and receiver have a Blackbird device and supported network the following differences are expected in the UX.

Service Availability: The File Transfer option in any touch point *shall* always be enabled to let the sender initiate a file transfer.

File Transfer Progress Bar: For a Blackbird end to end file transfer the upload *will* start immediately after the sender hits send, regardless the acceptance by the receiver.

File Transfer Delivery Notifications: The Blackbird release of joyn does not mandate use of specific iconography or text to indicate delivery of file status. Whatever icons the OEM chooses, status needs to be easy to see and understand but at the same time *should* not cause cluttering of the UI.

- **Upload Completed:** When the file has successfully uploaded to the server, once progress bar reaches 100%, progress bar removed and file preview remains with no further status marker.
- **File Acceptance Prompt delivered:** The moment the receiver is aware of the File Transfer (Notification received). See section 7.1.2.
- **Content Delivered:** Recovery of the File by the Receiver achieved. When the File Transfer has reached the receiving end, the sender's device *should* display the 'delivered' icon/text aligned with the application's UI principles.
- **Transfer Failed**: The 'alert/failed' icon/text *should* be displayed on the initiating device and a retry button shall be presented to resend the file when:

  - Upload of file has failed to reach the server.
  - File Transfer reached a problem of time out in the network storage.
  - File Transfer has not been accepted by the receiver (i.e. download of the File never happens, Network Storage Time Out is set by the MNO).
  - Has been cancelled by the sender or by the receiver then the 'alert/failed' icon/text *should* be displayed on the initiating device.

  NOTE: A transfer can fail because the File Transfer has reached MAX SIZE/FT WARN on the receiver side. The sending device however will not be aware of this.

File Transfer interruptions: File Transfer interruptions will be managed in case of sender's network issues: while a File Transfer is in progress, the device should be able to detect an interruption of the File Transfer session and should be able to send again the file automatically without any action of the user.

If after an interruption no further part of the file can be transferred then the transfer will be considered as failed and no further automatic attempts will be done to transfer the remaining part of the file.

7.1.1.2 Blackbird File Transfer interworking with a Legacy device transfer experience

If a Blackbird supported device and network attempts a File Transfer to a Legacy device the following differences are expected in the User Experience.

Service Availability: The File Transfer icon at any entry point *shall* only be available when the receiver is connected to the network, if receiver is not connected, the option *will* not be available.

Thumbnail: Thumbnail previews are not available when receiving a file from a device that does not support thumbnails (for example, a legacy client).

File Transfer Progress Bar: On sending of a file, the sender *will* be displayed a progress bar, this progress bar is dependent of the receiver accepting the file.

File Transfer Delivery Notifications: The present document does not mandate use of specific iconography or text to indicate delivery of file status, whatever the choice, it needs to be easy to understand and visible but at the same time *should* not cause cluttering of the UI.

- **Upload Completed = Content Delivered:** This status describes the moment when the download of the File was achieved on the receiver side. The same notification used for content delivered in Blackbird end to end experience *shall* be used.
- **Upload Failed:** The 'alert/failed' icon/text *should* be displayed on the initiating device, following the specific application's UI principles when:

  - Upload of file has failed to reach the receivers device.
  - File cannot be delivered due to a network or client failure.
  - Receiver/sender no longer connected to network.
  - Receiver never accepted the File Transfer.
  - File Transfer acceptance prompt time out (if no auto-accept enabled), see section 7.1.2.
  - The maximum file size authorised by the receiver's MNO has been reached

7.1.2   Receivers Experience

The receiver of a File Transfer *will* be notified according to supported network and device principles.

File Information: File information such as type, name and size *should* be displayed in the chat view prior to acceptance of file transfer.

File Acceptance Prompt: Before accepting the file transfer, file information such as type and size shall be displayed in the file acceptance prompt. The receiver can see a visual representation of the content being sent within the chat window. Two scenarios are possible:

4. Receiving Images or Video: When receiving images or video, the recommendation is not to display the file name as it is usually an alphanumeric code without meaning, but a small preview of the actual image or video shall be displayed.

5. Receiving other types of files: the name shall be displayed when receiving other types of files and the visual representation *will* be an icon. This icon *will* be based on the application that *will* be used to open the file and that is available in the receiver's device (e.g. logo of the music player for audio file, logo of the address book for contact card). If the content does not have a thumbnail, i.e. the file type cannot be detected or no application is present on the device to open the file, then the generic default file icon *will* be displayed in place of the thumbnail.

File Transfer Progress Bar: If the file transfer has been accepted, the progress bar *will* initiate, until completion of download. The progress bar *may* also be visible within the notification tray when the receiver is outside of the current chat session if the UI allows. The receiver's progress bar is independent of the Sender's progress bar.

Storage of File: Received file *should* be stored in the standard download folder according to the OEM's design principles. It is suggested that a dedicated 'joyn transferred content folder' be provided.

Lack of Storage Space pre acceptance: If a receiver's device does not have enough storage space to download full file, a notification *shall* be provided before downloading the file. Storage space *shall* be free before the download can be initiated. The user *will* then be able to start the download as long as the FT is still valid.

File Transfer Log: Each File Transfer needs to be registered in an activity log in the user's device (for files sent and received).

Expiry of FT: A 'Time Out' notification needs to be displayed in the following scenarios:

- **Session Time Out:** Legacy devices have a session time out if the FT is not accepted within a short period of time; this *must* be displayed within the chat window.
- **Network Storage Time Out:** Blackbird end to end experience allows the network to store the file for a limited period. If retrieval of file has not occurred within MNOs set time frame, the file transfer *will* expire.

Opening of File: Once fully downloaded, receiver can be prompted to open the file in a relevant application.

Aggregation of FT notification with Chat Notifications: If a user receives a FT notification followed by a chat message from the same contact, the notifications can be aggregated to prevent multiple notifications appearing to the user.

7.1.2.1 Acceptance of File transfers

File Transfer *will* require a manual acceptance to initiate download of file.

The "Accept" option *may* be available by clicking on the File Transfer thumbnail from the Chat session (when in Chat) or by clicking on a "accept" button (direct from notification tray

or pop up, or in Chat). Acceptance or selection of the notification *shall* lead to a chat session opening and displaying a file.

Auto Accept FT: Auto Accept (AA) *will* reduce the risk of session time out when receiving a file from a Legacy device, the AA option *will* be configurable by the MNO at the network level and the user *will* also have an option within the device settings to enable/disable the AA option.

Auto Accept Principles:

- FT Auto Accept *shall* only apply to the File Transfer use case. The Auto Accept *shall* not be applied to the joyn In Call features such as Image Share (content sharing when in a call).
- File Transfer Auto Accept can be pre-set at the network level by the MNO to manage the incoming File Transfer (that is by default mode configured on File Transfer Accept: ON/OFF). The Auto Accept *will* be configurable by the user in the user settings menu to prevent AA in this scenario:

  - If network sets AA to 'ON', user can disable this within the settings menu see section 9.1.
  - If network sets AA to 'OFF' user should receive a pop up asking if they would like to Auto Accept future FT requests. User selecting AA to be activated would allow auto download of future requests. Again, user can subsequently disable this within main settings.

If the Auto Accept for File Transfer is 'active' the device *shall* behave as follows:

- There *shall* not be any user manual acceptance or confirmation *required* to trigger the incoming File Transfer.
- An incoming File Transfer *shall* be accepted automatically by the device (similar to an incoming file that has been manually accepted for download).
- The notification of an incoming File Transfer *shall* be the same (non-intrusive) as for the non- Auto Accept case. Standard file reception notifications *shall* be used (on download progress and completion).
- There *shall* not be any difference in behaviour on the sender side caused by the introduction of Auto Accept for File Transfer.
- The default setting for Auto Accept when roaming *shall* be 'de-activated'.
- If the user selects Always Accept when roaming the setting of the Auto-Acceptance when roaming automatically changes to 'Active'. The user can change the switch at any time manually.
- When the user is on a Wi-Fi network, Auto Accept *shall* assume it is on a home network, irrespective of geographic location.

- For large files, Auto Accept *shall* be deactivated when receiving a large File Transfer (size as configured by the MNO with the FT WARN SIZE parameter).

7.1.2.2 Blackbird End to End Receiver Experience

A Blackbird supported device and network receives a file from another Blackbird device and network.

Validity of the FT: Blackbird end to end experience allows the network to store the file for a limited period. If retrieval of the file has not occurred within MNOs set time frame, the file transfer *will* expire.

File Download Interrupted: File Transfer interruptions *will* be managed in case of a network issue. While a File Transfer is in progress, the device *should* be able to detect an interruption of the File Transfer session and *should* be able to automatically re-download the file without any action by the user. There *shall* be one automatic attempt to resume the file transfer, always maximising the possibilities of a contact receiving a file.

If the File Transfer has been interrupted due to network coverage being lost, this single attempt to resume the File Transfer will initiate once the network has been recovered.

If the automatic retry fails the receiver will be able to re-initiate download manually.

Lack of Storage post Acceptance: If the user accepts the File Transfer and when File Transfer is in progress there is a lack of storage space, the exception must be handled by the OEM.

File Transfer thumbnail: a small preview of the actual file will be shown as a thumbnail. This is a small version of the actual image or a frame selected from the video, it is suggested that a frame is chosen from approx. the 20% point of video length.(The OEM is free to develop other convenient experience to create this snapshot.)

7.1.2.3 Blackbird Device Receiving File Transfer from a Legacy Device

A Blackbird supported device and network receives a file transfer from a Legacy device and network.

Storage space: If there isn't sufficient storage space on the user's device, then the user *will* be warned of the incoming File Transfer and the incapability to receive the file, then the File Transfer *will* be automatically rejected.

Thumbnail: Thumbnail previews are not available when receiving a file from a device that does not support thumbnails (for example, a Legacy client).

File Transfer Failed: The user *will* be notified of the File Transfer failure when:

- File Download has been interrupted: The File Transfer interruptions *will* not be managed in case of sender or receiver network issues, the File Transfer fails.
- File Transfer reaches Time Out: A notification to show the receiver failed to accept the file transfer within the *required* time before the session expired.

7.2   Group File Transfer Functional Description and UX

Group File Transfer allows a Blackbird user to send a given file to more than one contact. The full transfer process *shall* be adapted.

The File Transfer (nominal case) *shall* be pushed to all the receivers at the same time. The functionalities defined in case of 1-to-1 File Transfer remains active:

- Notifications and progress bar management
- FT Auto Accept (if active)

7.2.1   Group File Transfer – Sender's Experience

Service Availability: The File Transfer icon *shall* always be enabled in a Group Chat conversation hosted on a joyn Blackbird network to let the sender make a FT with no information about the receiver's status.

The sender shall always be able to transfer a file immediately regardless of whether the participants in the chat are using a Blackbird or Legacy device.

If the Group Chat is hosted on a Legacy network File Transfer shall not be available.

Entry points: Group File Transfer *should* be offered for all Share touch points provided natively by the device. In order to transfer files the user *should* be able to:

Initiate a Group FT from an existing group chat window.

Access the content browser (gallery, file browser, etc.) for selecting file to transfer and then the user can select contacts in a list of joyn list of contacts.

Transfer log: The way to display the log depends on the way the sender initiated the File Transfer:

- **Existing Group Chat:** The FT *shall* be reachable from existing thread within this Group Chat window.

- **Group FT from Content Browser**: The user shall be able to select FT and select one or more contacts from the joyn contact list. The FT generates a new Group Chat conversation and FT *shall* be accessible from this point.

Group File Transfer validity: The network shall be able to store the file for a limited period. If retrieval of the file has not been made within the MNOs set time frame, therefore the file transfer *will* expire.

Group File Transfer Status Notification: In a Group Chat there shall be a notification provided to the sender for Group File Transfer. The notification *shall* be triggered by the receiving device confirming to have received the thumbnail preview (incl. download link). An aggregated notification shall be available (presented similar to Group Chat Notifications). By user interaction (e.g. click on the file transfer), all the individual FT notifications *will* be displayed. (Please refer to 7.1.1.1 for more information on notifications).

- **Upload Completed:** This indicates the file has successfully been uploaded to the server, progress bar reaches 100%, progress bar removed and file preview remains with no further status marker. There is only one progress bar for the group share.
- **File acceptance prompt delivered:** From the moment one of the receivers are aware of the File Transfer (notification received) the aggregated notification indicates that the invitation has been delivered. It shall be clear for the user that it does not mean that all receivers have received the invitation, and that for detailed information he has to access the individual's notification status view. In case of a Legacy recipient the notification will be shown when the chat message with a link (see section 7.2.2.3 below) is delivered.
- **Transfer Failed**: When the upload of the file has failed to reach the server or when the File Transfer has timed out in network storage, or if the File Transfer has never been accepted by all the receivers (i.e. download of the File never happens), or has been cancelled by the sender or by all the receivers then the 'alert/ failed' icon/text *should* be displayed on the initiating device. Only when the upload of the file has failed, should the sender be offered some way to resend the file.

Group File Transfer Progress Bar: Only one status bar shall be displayed, which shall indicate the progress of the upload of the file to the HTTP content server (not the progress of download by any or all of the recipients).

Sending images: To improve the experience when transferring images, there *will* be the possibility to preview an image and resize it at point of send within the Chat window, which gives context to the FT. This will follow the same requirements as in 1-to-1 File Transfer, see 7.1.1.

7.2.2   Group File Transfer – Receivers Experience

7.2.2.1 Receiver with a Blackbird device

This experience matches that of File Transfer between two Blackbird devices and networks. See section □.

7.2.2.2 Receiver with a Blackbird device on a Legacy Network

A Blackbird device on a Legacy network *will* behave as a Legacy device.

7.2.2.3 Receiver with a Legacy device

Reception of the FT: All File Transfers are notified as a plain text link in a group chat message, subject to the same conditions that apply to receiving a group chat. In order to download the file, the recipient *will* have to select the link and open it in a web browser.

The plain text link *should* be self-explanatory and not obscure, for example it could display 'Click here to download [filename]<link>'

Thumbnail: Thumbnails are not supported on Legacy devices.

File Transfer Progress Bar: There *will* be no in-chat progress notification as the file is downloaded within a browser.

File Download Interrupted: If the download fails the user can click again on the link.

File Transfer Timed Out: Download *will* fail if the Network Storage Time Out or maximum number of downloads has been reached.

7.3   Dependencies and integration with other features (including multi-device)

File Transfer and Chat: A File Transfer is displayed to the user through a Chat conversation. The users engaged in a File Transfer need to be able to continue to chat while the file transfer occurs in the background.

Blocking File Transfer: Users are allowed to qualify undesired incoming File Transfer requests as spam. Please refer to the "Blocking joyn Services" section 10.

7.3.1   Multi devices and File Transfer

File Transfer *shall* be supported in a multi devices environment.

It means that a joyn mobile user *shall* be able to initiate and to receive File Transfer from his mobile phone but also from other devices (on which he *will* be connected reusing his joyn mobile identity).

7.3.1.1   User Experience Description for Multi Device File Transfer

7.3.1.1.1   Sender's Experience

- Nothing changed regarding the user journey to initiate a File Transfer.
- Log and status of delivery *shall* be displayed on the sender's device initiating the File Transfer.

7.3.1.1.2   Receiver experience

- If the user is connected on one or more Legacy devices; the FT is only in MSRP mode. The file *will* be transferred to the device accepting the file. The acceptance prompt pushed on the other device, will be cancelled. Although having Auto Accept activated on multiple devices is not recommended, in this case it is the first device to answer which will receive the file.
- If connected on two Blackbird devices; the incoming FT notification is pushed to both devices in HTTP mode.
- The user could re-attempt to download the same file from the same joyn identity. The number of attempts is a parameter that *will* be defined operator by operator (this parameter *will* be used for multi devices use cases, for File download when one of the receiver of a Group File Transfer is a legacy user, or for process of Recovery/Resuming in case of network or capacity storage issues).
- When the number of maximum downloads for an individual file has been reached, future attempts to download the file *will* fail.
- If not connected, the File Transfer *will* force the Store and Forward logic, then the File Transfer *will* be notified to the first devices reconnecting to joyn, if the device is a Blackbird device. If the first device to reconnect is a Legacy device, the message will be stored until a Blackbird device comes online.

- If the user has two devices and is in an active chat on one of them, the FT associated with the chat goes automatically to the device on which the chat is taking place

7.4   Technical implementation

7.4.1   Specification References

joyn Blackbird shall implement File Transfer according to section 3.5 of [RCC.07 RCS 5.1]. Following functionality described in [RCC.07 RCS 5.1] is not included in joyn Blackbird:

- Store and Forward for MSRP based File Transfer. Section 3.5.4.7 of [RCC.07 RCS 5.1] is therefore not applicable for joyn Blackbird.
- File Transfer in Group Chat using MSRP. Section 3.5.4.2 of [RCC.07 RCS 5.1] is therefore not applicable for joyn Blackbird. To indicate that this mechanism is not supported, joyn Blackbird clients and Messaging Servers shall include the +g.3gpp.iari-ref="urn%3Aurn-7%3A3gpp-application.ims.iari.rcse.im" feature tag in the Contact header field they provide as part of the SIP INVITE requests or SIP 200 OK responses sent during the setup of the Group Chat, but not include the "urn%3Aurn-7%3A3gpp-application.ims.iari.rcse.ft" IARI which is used in RCS 5.1 to indicate the support of the File Transfer in Group Chat mechanism .
- File Transfer Resume for MSRP based File Transfer. The paragraphs of section 3.5.4 and 3.5.4.3 of [RCC.07 RCS 5.1] where this is discussed are therefore irrelevant
- Personal Network Blacklist. Section 3.5.4.5 of [RCC.07 RCS 5.1] is therefore not applicable for joyn Blackbird.

In joyn Blackbird, the File Transfer over MSRP service shall be based on OMA SIMPLE IM and a preference is given to the HTTP File Transfer when available which shall be the case between two Blackbird users.

7.4.2   Configuration Parameters

Configuration parameter	Description
CHAT MESSAGING TECHNOLOGY	See section 5.3.2
PROVIDE FT	Fixed Value: 1 Joyn Blackbird will always include File Transfer NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. A value of 1 shall be assumed in this case.
FT MAX SIZE	Service Provider Configurable
FT WARN SIZE	Service Provider Configurable
FT THUMB	Fixed Value: 0 For MSRP based File Transfer no thumbnail is provided as that is only intended for interworking with Legacy clients NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. A value of 0 shall be assumed in this case.

FT STANDFWD ENABLED	Fixed Value: 0
	MSRP based Store and Forward is not provided.
	NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. A value of 0 shall be assumed in this case.
FT CAP ALWAYS ON	Fixed Value: 0
	MSRP based Store and Forward is not provided.
	NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. A value of 0 shall be assumed in this case.
FT AUT ACCEPT	Service Provider Configurable
FT HTTP CS URI	Service Provider Configurable
	Will only be included for subscribers on a joyn Blackbird network that have a joyn Blackbird primary device
	NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. File Transfer via HTTP shall be disabled in this case.
FT HTTP CS USER	Service Provider Configurable
	NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. File Transfer via HTTP shall be disabled in this case.
FT HTTP CS PWD	Service Provider Configurable
	NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. File Transfer via HTTP shall be disabled in this case.
FT DEFAULT MECH	Fixed Value: HTTP
	NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. A value of MSRP shall be assumed in this case.

Table 36 : Blackbird File Transfer configuration parameters

7.4.3   joyn Blackbird Specific Technical Behaviour

Note: Functionality in this section is considered applicable only for the joyn User Experience and is therefore not reflected in RCS 5.1

7.4.3.1 Handling of File Transfer in Group Chat with Legacy Clients

If a HTTP File Transfer is initiated and one or more of the parties in the Group Chat does not support receiving it (i.e. did not provide the *application/vnd.gsma.rcs-ft-http+xml* MIME content type in the *a=accept-wrapped-types* attribute in the SDP that it provided during the Group Chat session set up), the conference focus shall compose a plain text message to those participants explaining that a file was sent to the participants in the chat that cannot be retrieved automatically by the client. That message shall also provide the link to the file to allow retrieving the file manually through the browser.

When receiving the MSRP 200 OK response on the MSRP SEND request used to relay this message, the Messaging Server shall send a positive-delivery notification to the sender in case such a notification was requested

7.4.3.2 Image Compression

When transferring a large image using File Transfer (regardless of whether it is HTTP or MSRP based), as described in section 7.1.1 a joyn Blackbird client shall check whether it is possible to reduce the size of the image. It may use following mechanism for this:

- The default scale factor F for the image shall be, F = min(1280/w, 1280/h, 1.0). It shall be noted the w (width) and the h (height) shall be used in pixels for the calculation.
- If the factor (F) is 1, the original image shall be transferred.
- Otherwise, the size of the image shall be reduced using following algorithm:

  - Scale both dimensions by the same factor F (same for width and height so the aspect ratio is maintained).
  - Compress as JPG with q=75%
  - Compare the new image size with the original, and only offer the possibility described in section 7.1.1 to send a resized image if the resulting file is smaller than the original one

7.4.3.3 Multi-device

To provide a proper multi-device behaviour and consistency also when devices are switched off, two aspects need to be taken into account when a subscriber has multiple devices:

1. The provisioned value FT AUT ACCEPT should be disabled.
2. Both devices should support the same set of services i.e. if one of the user's devices does not support HTTP File Transfer e.g. because it is a joyn Hotfixes [Hot Fixes] device, the other devices should be configured not to support HTTP File Transfer either. This shall be managed through the primary device. Only when the user has a joyn Blackbird primary device, secondary devices shall be configured to support HTTP FT. When the user has a joyn Blackbird primary device, the Auto-Configuration Server shall disable any remaining joyn Hotfixes [Hot Fixes] secondary devices of the user (that is, change their digest password and respond to their configuration request with a document setting version and validity to 0).

7.4.4   Implementation Guidelines

7.4.4.1 File Transfer and low storage space scenarios (Clarification)

When exchanging capabilities and provided the right coverage is in place, the File Transfer service (or Image Share) should be reported as available independently of how much available space is available to store files (even it is full or almost full).

At UI level, the behaviour should comply to the UX guidelines, that is the receiver should be informed that there is not sufficient storage space to accept the received File Transfer request and if the user accepts the transfer nevertheless, the request should be rejected and the user should be informed that this is not possible. From the protocol level though, if a File Transfer (or Image Share) invitation is received, the receiver's joyn client or implementation should check the available storage space. In case the available space is less than the size of the file, the File Transfer should be automatically rejected (no user interaction).

7.4.4.2 Separate session for MSRP File Transfer during IM/Chat session (Clarification)

Contrary to the OMA SIP/SIMPLE IM specifications, in joyn Blackbird it is not allowed to start a MSRP file transfer with a RE-INVITE during an on-going IM/Chat session when the corresponding instructions are received.

In order to start a MSRP file transfer session during an on-going IM/Chat session where File Transfer over HTTP is not supported, the initiating user agent client (UAC) shall establish separate SIP and MSRP sessions using INVITE request with all required SDP information according to [RCC.07 RCS 5.1].

7.4.4.3 File Transfer chunk size (Recommendation)

The recommended chunk value size is 10 kilobyte.

7.5 Roaming, Data records

7.5.1 Roaming

File Transfer Auto Accept *shall* be by default deactivated when roaming. However, as for any other joyn services, the user *shall* have the capabilities to activate the feature when roaming (see sections 9.1 below and 11 below).

7.5.2 File Transfer Data Record

A MNO should be able to trace the file transfers sent or received by their customers, and to know if the service succeeded or failed.

Thanks to these traces the operator shall be able to recover for each file transfer:

- the sender identity
- the receiver(s) identity(ies)
- the time stamp
- the status of delivery
- the size of the file
- the name of the file

The link to the content (including thumbnails) should be a URL that is identifiable within the sending and receiving network (for example to apply charging policies when receiving files from other networks).

8 In-call sharing

The joyn specification defined two in-call services – Image Share (IS) and Video Share (VS). In addition, direct access to Chat shall be required in Blackbird devices.

> NOTE: For the scope of joyn Blackbird only in-call sharing is considered and outside of call use cases are deferred to further releases of joyn.

8.1   Service definition

Video Share: VS is a service that allows sending a "live" or recorded video while in a Voice Call with a contact, by streaming it in real time (as opposed to sending a whole file) to the receiver's screen. VS is unidirectional by definition and does not carry the sound as it overlaps the voice call. Nevertheless, the receiver of a VS, if conditions exist, *shall* be able to start in turn a VS session so that, effectively, it *will* be a 2-way session. However, such sessions *will* be independent and each user *shall* be able to terminate their, or both, video streams.

Image Share: IS is a service that allows sending a picture (either stored in a user's device or taken for the purpose) while in a voice call with a contact. The service differs from File Transfer only in terms of user experience and interface. In fact, sharing during a call, given the real time context , *shall* be an immediate task with minimal user interaction, hence the requirement of displaying the shared content within (or on top) of the calling screen.

With regards to the following sections, it has to be noted that the status of "sender" and "receiver" in the context of in-call share is independent from who initiated the underlying voice call, and only depends on the intention of sharing.

In Call Sharing Touch points: The entry points above shall clearly indicate to the user that they are about to start a communication using joyn. Standard joyn iconography, see the GSMA Digital Guide [Digiguide], shall be used to denote a joyn service.

8.1.1   Sender's Experience

Entry points for in-call sharing: IS and VS, by definition, can only be started while in a voice call with one contact. The sharing buttons *shall* be integrated and displayed in the calling screen to give direct access to the functionality. In particular, any solution that requires more than two steps to access the functionalities *must* be avoided (menu button, notifications etc.)

It *shall* not be possible to start IS and VS from any other entry point.

Service availability: The availability of the services relies on up-to-date end to end capability information for each of the two services. Capability information *shall* be refreshed just after the call has been established and in a "push" manner whenever the conditions of one of the parties change. It *may* also be refreshed whenever the screen is activated during a call as it means that the caller is looking at the screen and *may* then discover the service, the capabilities presented by the device depend on the following:

- Access bearer: The bearer is used as an estimator of the bandwidth available for in-call share, hence only IS *will* be available on 2G bearers and VS *will* be available one-way on 3G and two-ways on Wi-Fi, HSPA and higher.
- Service provisioning status: A service provider *shall* be able to control the IS and VS services provisioning[27].

Multiparty calls: In-call Share is not available on call with more than 2 participants

---

[27] Parameters: PROVIDE VS and PROVIDE IS

Initiating an In-call Share: On the call screen there *must* be two entry points, one for Live Video Share and another for remaining Content Share options (including sharing a video from media gallery). This overlaps the service definition that separates the IS and VS use cases, but follows the expectation that Live Video *will* be the most popular service and *will* benefit from a direct access rather than a two-step.

1. "Live Video": Selecting the live video share button shall present to the user the option for sharing "Live Video". Once selection is made and confirmed the video to be streamed should be shown and fit into the calling screen.
2. "Content Share": Selecting the share button shall present to the user the available options for sharing, typically "Camera" and "Media gallery". Depending on the selection the user will either take a picture or select one from a picker and confirm their intention to send. At this point, a large preview of the picture shall be fit into the calling screen and a progress bar shown to display the progress of the transfer. If a video is selected, the video stream should be shown and fit into the calling screen.

8.1.2   Receiver's Experience

Acceptance of a VS/IS: Whenever one party in the call starts a VS/IS session; the receiver *shall* be prompted for acceptance directly in the calling screen. Upon acceptance, unless the receiver is using a headset, the loudspeaker shall be turned on automatically:

- **IS:** A progress bar for the download *shall* be displayed on screen together with a thumbnail if available. Once the download is completed the received picture *shall* be displayed within the calling screen making optimal use of the screen estate.
- **VS:** The video stream *shall* be displayed within the calling screen making optimal use of the screen estate.

Rejection of a VS/IS: The receiver *shall* be able to reject an incoming share. No auto-accept mechanisms are *required* for this use case as the voice call provides the context for real time manual acceptance.

8.1.3   Experience while sharing

Responding to a shared video/image: A user *shall* be able to initiate a IS/VS in response to a session initiated from the other party. There are no limitations on the combinations, meaning that a user could respond to a IS either with another IS or a VS and vice versa they could respond to a VS either with another VS or an IS.

Switching camera: During a VS session it *shall* be possible to dynamically switch between front (see-me) and back camera (see-what-I-see) without interrupting the stream. The default camera should be the front camera.

Terminating a share: A user *shall* be able to terminate either their own and/or a received sharing session. Termination *will* have effect on both ends. Termination of a sharing session *will* not affect the underlying Voice Call that *will* continue unaltered.

Terminating a call: If the call is terminated the share sessions *shall* be cancelled.

Call on hold: If the call is put on hold; the share sessions *shall* be cancelled. At call resumption, sharing *will* follow the "initiating share" flows.

- If a user puts a call on hold and engages in another call, the active call *shall* offer the IS/VS services according to the same service logic as a normal voice call.

8.1.4   Notifications and appearance

Notifications: Notifications for IS/VS can only be displayed within the calling screen and be prominent enough not to be confused to any other element of the calling screen.

In-call sharing initiation buttons: in the native calling screen, two buttons shall be shown one for initiating Live Video and one for the other sharing options. For native devices, the sharing buttons *shall* be integrated in the grid of in-call controls offered by the core calling application.

- Entry points for additional services in the call screen (Chat and Location Share) are covered in section 8.2.2.

Share control buttons: The commands for terminating a share or for responding with an own share *shall* be visible at all time while in a sharing session.

Iconography: Please refer to the GSMA Digital Guidelines [Digiguide].

Image and Video display: For the IS and VS use cases, the media content *shall* be displayed in the calling screen making the best use of the screen estate, ideally using the full screen, and ensuring the key call control options are kept visible. A "tap-to-view" experience is strongly disapproved of.

8.1.5   Image and Video quality

Given the volatile peculiarity of Image Sharing (instantly sharing a moment in the context of a call) and the consequent higher importance of a rapid transfer on quality, it is *required* that pictures sent via Image Share are automatically resized to max 1280px on their longest dimension, obviously preserving the original proportions.

With regard to Live Video it is *required* that video quality adapts dynamically to the quality of the underlying network link in order to ensure continuity of the stream on a side and the best possible quality at all times on another side.

8.1.6   Video Orientation

With joyn, operators can improve the user experience when viewing video content. The joyn service overcomes the interoperability issues sometimes encountered by users of other video content delivery services. When sending or receiving video content via joyn, the user can be assured that the orientation *will* be automatically adjusted to ensure maximum utilisation of the recipient device screen. It *may* be possible for the receiver to rotate their mobile device to allow the video to fit the full screen.

One way session – sender experience:

- If a sender holds the phone in portrait mode, the video is encoded and sent with portrait proportion and displayed fitting the full screen on the sender's side.
- If a sender holds the phone in landscape mode, the video is encoded and sent with landscape proportion and displayed fitting the full screen on the sender's side.
- If the sender rotates the mobile device from portrait to a landscape orientation, or vice versa, the aspect ratio of the encoded video is updated and displays on the recipient mobile device accordingly.

One way session – receiver experience:

- If a video is received in portrait mode while the mobile device is held in landscape mode, the incoming video is displayed with the right proportions fitting the device screen in height and leaving blank space in width.
- If a video is received in landscape mode while the mobile device is held in portrait mode, the incoming video is displayed with the right proportions fitting the device screen in width and leaving blank space in height.
- Whatever the direction and degree to which the sender rotates the mobile device, clockwise or anti-clockwise, the video is always encoded with reference to an absolute "down" (i.e. gravity) to avoid video being displayed upside down at the receiving end.
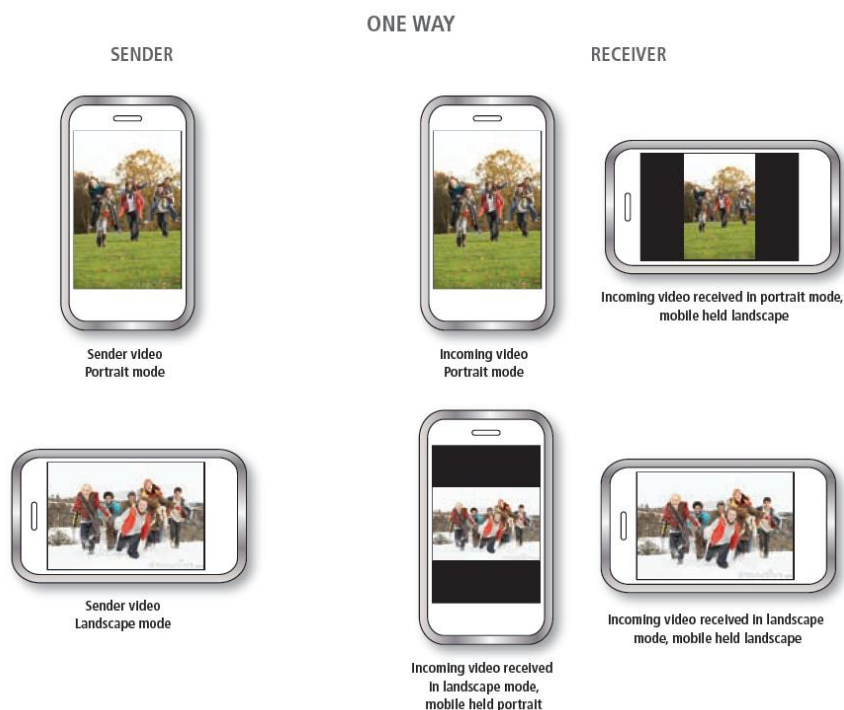
: Video share Orientation

Two way session

The experience in a two way session *will* be a combination of the above described cases.

: Two-way video share orientation

Figure 13

: Video Share orientation, Landscape, Portrait

8.2   Interaction with other features

There is no relevant interaction of In-call Share functionalities with messaging and content share services.

8.2.1   In call share in a multi-device context:

Due to the dependency of the in-call share services on an active voice call, the sharing behaviour *will* be exactly the same as in a single device scenario due to the fact that the call is always established between two and only two devices, in particular:

- **Sender has multiple devices:** It *shall* be possible to initiate an IS/VS only from the context of the active call on the calling device.
- **Receiver has multiple devices:** Notifications of the sharing invite *shall* only be displayed in the context of the active call on the device engaged in the call.

8.2.2   Call screen entry points to other services

Beside IS and VS, the call screen *shall* offer entry points to joyn Chat and Location share. The detail of such action is detailed in the dedicated chapters; however it is important to note that whenever such services are invoked from the calling screen, an "in-call" specific experience is highly *recommended* so that the context of the call is not interrupted.

8.3   Technical implementation

8.3.1   Specification References

Content Sharing *shall* in joyn Blackbird be realised as described in sections 2.7.1.2 and 3.6 of [RCC.07 RCS 5.1]. Following functionality *shall* not be part of joyn Blackbird though:

- Sharing outside of a voice call. Sections 3.6.1.3, 3.6.1.4.4, 3.6.2.2, 3.6.2.4, 3.6.4.1.2 and 3.6.6.2 of [RCC.07 RCS 5.1] as well as their subsections are thus not applicable for joyn Blackbird.
- Multi-device handling: Content Sharing *shall* only be available on the device involved in the voice call. Section 3.6.1.4.2 of [RCC.07 RCS 5.1] is thus not applicable for joyn Blackbird and the specific handling for Broadband Access clients not involved in a voice call that is described in section 3.6.4.1.1. This also affects the handling for the Video and Image Share capabilities on Broadband Access clients described in section 2.6.1.1.2 of [RCC.07 RCS 5.1].
- Recording of a shared video. Section 3.6.4.1.3 of [RCC.07 RCS 5.1] is thus not applicable for joyn Blackbird.

8.3.2   Configuration Parameters

Following configuration parameters defined in Annex A of [RCC.07 RCS 5.1] are specific to the Content Sharing. For Blackbird they *will* be handled as follows:

Configuration parameter	Description
PROVIDE VS	Service Provider Configurable NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. A value of 1 shall be assumed in this case.
PROVIDE IS	Service Provider Configurable NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. A value of 1 shall be assumed in this case.
ALLOW VS SAVE	Fixed Value: 0 It is not allowed to save the shared video in joyn Blackbird NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. A value of 0 shall be assumed in this case.
VS MAX DURATION	Service Provider Configurable
IS MAX SIZE	Service Provider Configurable

: Blackbird Content Sharing configuration parameters

Table 37

8.3.3   Implementation Guidelines

8.3.3.1   Call and joyn services concurrency (clarification)

A call is received and a Video Share is taking place from user A to B:

After starting the Video Share the capabilities are exchanged again, so depending on the network coverage and UI capabilities (ability to present a simultaneous Video Share or Video and Image Share) of both A and B, the Image and Video Share will be reported as available or not. If both handsets report Image and Video Share as available then:

- A should be able to start a new share; this new share will terminate the previous one. This will facilitate the sharing of several images during the call.

Again, after B has started the share service, neither user A nor B should be able to initiate further content sharing services over a call.

8.3.3.2   Video presentation for Video Share (Clarification)

The aspect ratio of the image shall be preserved when the video is resized to be displayed on the UE according to the screen dimensions.

8.3.3.3   Image Share optimization via image size reduction (Recommendation)

In order to provide the user a seamless experience when transferring images and be aligned with other internet applications providing the service, there is a proposal for a compression mechanism for images which are transmitted using the Image Share service and is similar to the mechanism for File Transfer described in section 7.4.3.2.

The recommended approach based on the principle of maximizing the range of devices/resolutions where the image will be displayed with sufficient quality is the following:

1. The default scale factor F for the image shall be, F = min(1280/w, 1280/h, 1.0). It shall be noted the w (width) and the h (height) shall be used in pixels for the calculation.
2. Please note that if the factor (F) is 1, the next step can be skipped.
3. Scale both dimensions by the same factor F (same for width and height so the aspect ratio is maintained).
4. Compress as JPG with q=75%
5. Compare the new image size with the original, and only offer the possibility to send a resized image if the resulting file is smaller than the original one

When a user sends an image to another user the size reduction algorithm will take place. Then if:

- the scale factor (F) of the algorithm is lower than 1, and,
- the result of the compression is a smaller file

The smaller file will be used for the Image Share service. Otherwise, the original file will be used.

Finally, it shall be noted that this process of evaluating whether the size reduction is an option and, if so, the size reduction itself shall happen before the SIP INVITE is sent to the recipient.

9   joyn settings

The joyn settings screen *shall* be a menu option accessible from the messaging settings menu. A link to this setting shall also be included in the networks settings when additional services are offered as in-call services.

9.1   joyn management menu/options

The following settings *shall* be offered within 'joyn settings' menu:

- **Chat Service (joyn instance switch):** The user shall be able to activate or deactivate the native joyn services through a joyn Master Switch in messaging settings. The instance switch should be called "Chat Service" not RCS or Rich Communication Services.
- **default messaging method:** A setting shall allow the customer to select the default sending method to be used when the customer sends a message before the answer to the corresponding capability check is received. Values for this setting shall be 'Automatic', 'SMS', or 'joyn chat' (where 'Automatic shall follow Fully Integrated Messaging behaviour as defined in section 4.2.2)
Default value shall correspond to the MNO setting IM CAP ALWAYS ON (IM CAP ALWAYS ON = 0, then default value = AUTOMATIC; IM CAP ALWAYS ON = 1 then default value = joyn message), but through this setting the customer is able to override the MNO option.
This requirement applies only as part of the fully integrated messaging option.
- **joyn user alias**: Customise the label, which the user wants to be displayed when communicating with joyn contacts.

- **joyn specific user predefined settings**: As an example, the default behaviour for the saving of in all Content Share (to store automatically or not).
- **joyn file transfer Auto Accept**: To control the behaviour of this functionality as described in section 7. When the functionality is activated by the network the following item *shall* be displayed in the settings menu:

    o FT Auto Accept: I/O (default value set to I),
    o FT Auto Accept while roaming: I/O (default value set to O)

- **joyn image resizing in file transfer**: To control the default behaviour of this functionality as described in section 7. The suggested options are:

    o **FT** image-**resize**: 'always resize', 'always ask', 'never resize'

- **joyn video resizing in file transfer**: To control the default behaviour of this functionality as described in section 7. The suggested options are:

    o FT video-resize: 'always resize', 'always ask', 'never resize'
    o The default setting shall be "always ask".
    o When "always resize" is selected by the user, a list of resolutions to resize the video file to be presented.

    - The default resizing option selected shall be 480p encoded at 1200 kbps

- **Personalization**: Optionally the settings related to user experience customization could be grouped within the general settings screen. Example of categories are:

    o Notification sounds
    o Notification preferences
    o Customized ringtones (for Wi-Fi Voice or best effort video)
    o Visual customization for chat (for example fonts, bubble styles, backgrounds and so forth).

9.1.1   joyn instance switch

joyn in its current state only allows one client at a time to run on a device.

Each client has its own instance switch to activate or deactivate that specific client. If the user chooses to turn the native joyn instance off, the native client is deactivated, keeping all its entry points visible but greyed-out/disabled, and all its joyn user related content available (Chat history, files, etc.). The joyn instance switch that shall be visible in the messaging settings menu of the device and *shall* be accessible at any time.

In this state, the native joyn client is disconnected. Consequently, no messages can be sent and capability requests are not answered. However, the user can switch on the deactivated native joyn client at any point in time - by enabling its joyn instance switch to trigger the deactivation process (popup with link) of the currently active client.

To allow the user to deactivate downloaded joyn apps (either in order to not use joyn anymore or use the native implementation), these download apps shall use a joyn switch in the settings that allow to enable or disable the joyn app.

9.2   Technical Implementation

When the user permanently deactivates joyn a HTTP configuration request with the parameter set to -1 (as described in [RCC.07 RCS 5.1]) shall be sent to the network at the first possible occasion

When the user re-enables joyn a HTTP configuration request will be done to verify whether the available version of the RCS configuration parameters is still valid.

10 Blocking joyn services

Blocking is a feature to provide user a way to block undesired communication services from certain contacts.

Some OEM support blocking voice and/or messaging (xMS) services on a per contact basis, if so there should be an additional option added for blocking joyn Chat, FT and IP Video and Voice services with joyn enabled contact. The user should be warned which joyn services will be blocked by using the feature.

If the OEM does not support blocking on a per contact basis, no specific function is required to allow the user to block joyn Chat, FT and IP Video and Voice services.

10.1   Blocking/Unblocking Joyn service principles

Using the native unified blocking functionality of the device (blocking all communication services); joyn services can be blocked on an individual contact basis, assuming the contact is a joyn user.

After initiating a block, User A *shall* not receive any joyn Chat messages, Chat notifications or FT invitations from User B or receive any IP calling services.

The consequences of blocking are only on User A's side. User B *shall* never be aware of the block.

The following actions *shall* happen on User A's device when blocking User B:

- User A *shall* receive a visual confirmation (pop-up) if blocking was successful.
- User A *shall* be able to see when the blocking was activated for User B (time stamp).
- Incoming notifications from User B *shall not* be presented to User A.
- Chat messages from User B *shall* be placed in a separate spam folder.
- Chat messages from User B *shall* not be displayed in User A's joyn Chat messaging logs.
- User B remains a joyn contact for User A, and is listed as such in the contact list view in User A's address-book.
- On User A's contact detail page, the icons for launching joyn services *shall* remain enabled for User B.

- User A *shall* never send a 'displayed' notification for any incoming message from a blocked contact.

If User A unblocks joyn services for User B, then:

- If blocked User B has sent messages or invitations to User A during the blocked period and the network supports Store & Forward, User A *shall not* receive those Chat messages, as they *will* have been delivered to the spam folder.
- User A shall receive a visual confirmation, icon/text, if the unblocking action was successful.

10.2 Touch Points to Block and Unblock joyn services

Entry points shall be those ones already defined by the OEM for unified blocking mechanism. For Blackbird devices, blocking/unblocking services *must* be clear and simple to complete for the user. It is advisable to provide access to block/unblock from these entry points

- **Contact Detail Page:** There *shall* be an option to block a contact accessible from the contact detail page within a subordinate menu option. The contact detail page *shall* present information on the current blocking state. This can be represented as an icon and/or text to clearly show the two states of blocked and unblocked services.
- **joyn Chat:** It *should* be possible to easily access the block/unblock services functionality from the Chat application (this can either be in an option menu or in the 'joyn contacts' screen).
- **Other block/unblock touch points are *optional*:** The block/unblock feature *shall* be presented depending on OEM already defined touch points.

10.3 Blocking for downloadable applications

Downloadable applications *should* provide the functionality to block a contact within the downloadable application. This does not need to be integrated into the native device blocking entry points (contact detail page etc.).

10.4 Group Chat for contacts with blocked joyn services

The blocking/unblocking mechanism shall apply also to Group Chat.

When the user initiates a Group Chat with a contact that they had previously blocked, or invites that contact to a Group Chat, the user shall be alerted. The unblocking of this contact shall then be proposed to the user and only if accepted shall the contact be added to the conversation.

10.5 Blocked Contacts and Auto Accept

Group Chats: Group chats may be configured to always be auto accepted (when it is set by MNO) but the user *shall* be informed whenever:

- A group chat is initiated by one of their blocked contacts.
- They are invited to a group chat in which a blocked contact participates.
- A blocked contact is invited to/joins an on-going group chat.

The warning message could be "One or more contacts you have blocked are participating in this group chat. Avoid responding or leave the group if you do not want them to see your messages".

File Transfer: A file transfer invitation from a blocked contact *shall* be ignored (i.e. not auto accepted). This *shall* not reveal to the sender that the receiver has blocked them. As per the guidelines, no notification *shall* be displayed to the receiver about these invites.

10.6 joyn services for contacts with blocked joyn services

It shall always be possible to launch a 1-to-1 Chat, File Transfer or, Content Share from any joyn touch point with a blocked contact.

When a user tries to initiate a joyn service with a blocked contact, the user shall be presented with a warning pop-up proposing to unblock the contact. If the initiating user accepts the unblocking then the service can be launched.

10.7 Technical implementation

10.7.1 Dependencies and integration with other features (including multi-device)

Blocking of contacts is only local to a device, when joyn identity is on multiple devices, the contact a user wishes to block *must* be done on all supported devices manually.

10.7.2 Specification References

Blocking of services shall be entirely done on the device.

For 1-to-1 Chat requests the Blocking shall use the handling defined in section 3.3.4.1.1 of [RCC.07 RCS 5.1].

File Transfer over HTTP shall be handled in the same way as Chat. The links to the file and icon provided in the File Transfer via HTTP body shall not be used i.e. neither the file nor the icon shall be downloaded.

For MSRP based File Transfer requests the Blocking shall use the handling defined in section 3.5.4 of [RCC.07 RCS 5.1].

10.7.3 Backward Compatibility

Blocking of contacts is backward compatible.

11 joyn Roaming

11.1 Roaming Behaviour

While a user is roaming, joyn *shall* behave as follows:

1. If the device is not provisioned to use the IMS APN or RCS-e APN for joyn, device general policy for data while roaming shall also apply to joyn. Devices will appropriately warn the user about data charges while roaming.

a) When data is off when roaming, then joyn will not be active.
b) When data is enabled when roaming then joyn will be active

2. If a joyn user is roaming and connects to a Wi-Fi network, the user is considered not to be roaming and joyn will be active.
3. If the device is provisioned to use the IMS APN or RCS-e APN for joyn and if one of the APNs is available, joyn will be deactivated by default and a warning shall be shown to the user to allow them activate joyn on request. Thus, joyn could be active or inactive depending on the following user´s choice:

> Active if the joyn roaming control for IMS/RCS-e APN is enabled by the user.
> Inactive if the user deactivates the joyn roaming control for IMS/RCS-e APN.

12 joyn accessibility

12.1 Objectives

To ensure that joyn services comply with existing accessibility guidelines for mobile devices.

12.2 Description

Many smartphones enable users to choose specific settings according to their preferences or needs. These settings are particularly important for disabled individuals who usually set parameters like print size, colour scheme and activate specific tools (vocalisation tool, voice command capability, magnifying tool) through a dedicated accessibility menu.

To foster the usage of joyn, it is highly recommended that these settings or tools are also available for joyn services.

This requires a full compatibility of joyn UI with preferred settings or accessibility enhancement tools available on the device.

The availability of accessibility settings or tools *should* be aligned with accessibility guidelines already present for other messaging services (SMS, IM or e-mail).

13 joyn States

A joyn native implementation may enter into the following states depending on certain conditions:

- **joyn permanently disabled**: This state is the starting point for a device that is started-up for the very first time or has been put by the network into this state. It leads to the automatic service activation process if the MNO is joyn enabled and the user has data connectivity.
- **joyn on set-up process**: joyn is in the middle of the service activation process. It is not yet visible on the device but HTTP requests are active.
- **joyn in launcher mode**: This state applies only for those networks that require the user to accept Terms & Conditions as described in section 2.3.3. It is considered highly likely that a user that rejected those Terms & Conditions on the first device

start-up, learns later about joyn and wants to activate it. The joyn set up icon shall be visible in this state, and if clicked, will trigger service activation.

- **joyn active**: joyn is configured and up and running in the device. Capabilities are exchanged, all entry points enabled and all available joyn services active.
- **joyn instance disabled**: This state is entered by a joyn client if the user has multiple joyn clients on a device and has activated another. In this state this joyn instance is off, all its entry points with the exception of the toggle joyn instance switch are disabled and all its user related content is available (Chat history, files, etc.). Since this joyn instance is disconnected in this state, no messages can be sent nor capability requests be answered.
  By clicking on the toggle joyn instance switch and switching it to ON the joyn client can be re-activated. At the same time, this will trigger the option (pop-up with link to settings of the active joyn client) to deactivate the currently active joyn client.

The following diagram illustrates all states and circumstances that drive a native app through each of the different states.
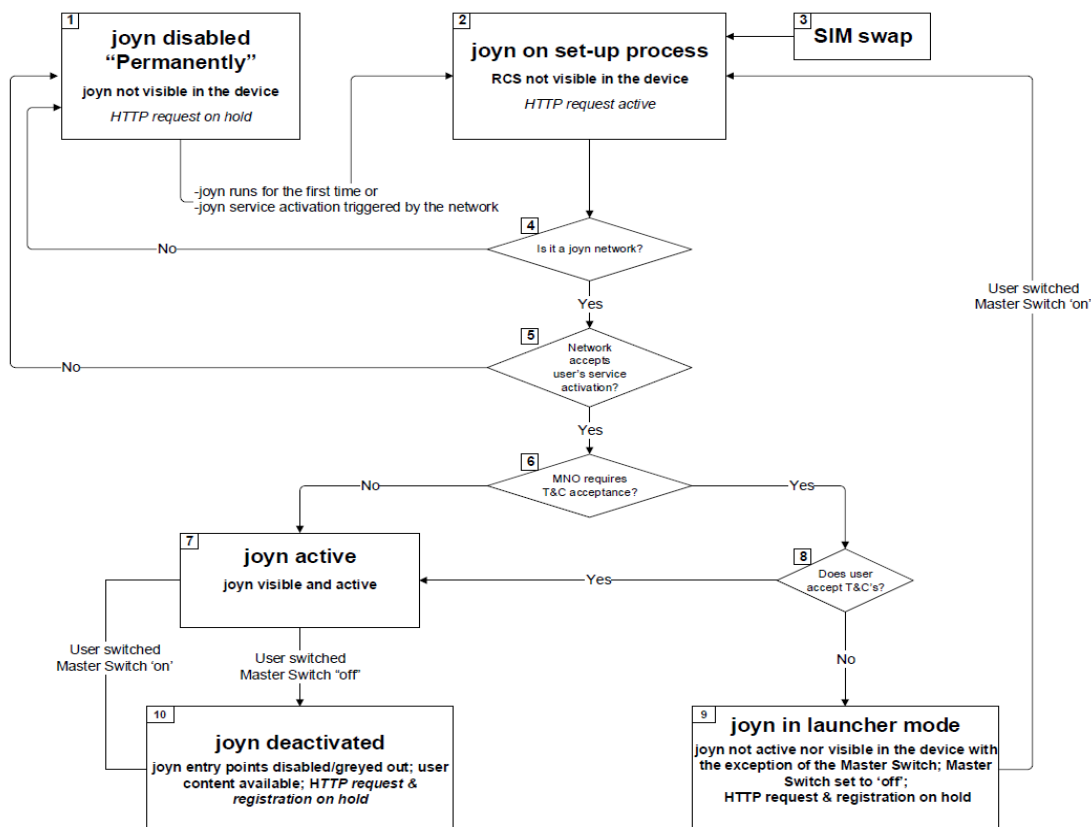
: joyn states

14 Emoticons

14.1 joyn Standard Emoticons

Emoticons	Character sequences	Examples describing graphical renditions
Happy, smile	:-) or :)	A happy or smiling face
Sad	:-(or :(	A sad face
Wink	;-) or ;) or ;o) or ;O)	A winking face
Big grin	:-D or :D or :oD or :-d or :d or :od or :Od or :OD	A big grin face
Confused	:-/ or :-\	A confused face
Blushing, embarrassed	:'-) and :"-) or :') or :'> or :-$ or :$	A blushing, embarrassed face
Stick-out tongue	:-P or :P or :oP or :-p or :p or :op or :OP or :Op	A stick-out tongue face
Kiss, red lips	:-* or :*	A kissing face or red lips
Shocked, surprised	:-O or :-o or :o or :O	A shocked, surprised face
Angry	:-@ or :@ or X-(or X(or x-(or x(or xo(or XO(	An angry face
Cool, sunglasses	B) or B-) or (H) or (h) or Bo) or BO)	A face with sunglasses
Worried	:-S or :S or :-s or :s or :oS	A worried face
Devilish	>:-) or >:) or >:o) or >:O)	A devilish face
Crying	:,-(or :,(or :'-(or :'(or :,o(or :'o(or :,O(or :'O(	A crying face
Laughing	:-)) or :)) or :o)) or :O))	A laughing face
Straight face, disappointed	:-| or :| or :o| or :O|	A straight face
Angel, innocent	O:-) or O:) or o:-) or o:)	An innocent face
Nerd	:-B or :B	A nerdish face
Sleepy	|-O or |O or |-o or |o	A sleepy face
Rolling eyes	8-) or 8) or 8o) or 8O)	A rolling eyes face
Sick, ill	:-& or :& or ;o& or :O&	A sick/ill face
Shhh! No speak, lips sealed	:-SS or :SS or :ss or :-ss	A face with sealed lips
Thinking, pensive	:-? or :?	A pensive face
Raised eyebrow, sarcastic look	/:-) or /:) or /:o) or /:O)	A raised eyebrow face or a face with a sarcastic look
Rose, flower	@):-	A rose
Cup of coffee	~o)	A cup of coffee
Drink, cocktail	)-|	A cocktail glass

Emoticons	Character sequences	Examples describing graphical renditions
Idea (light bulb)	*-:-) or *-:)	A light bulb
Love struck, heart	(L) or <3	A heart
Beer	(b) or (B)	A pint of beer
Broken Heart	(u) or (U) or \Z/	A heart broken in two
rock on!	\m/	A smiling face with rockstar fingers
pirate	:ar!	A face with eye patch
silly	8-}	A face with wobbly mouth and spinning eyes
applause	=D>	A face with clapping hands
Penguin	<(')	A small penguin
Music Note	-8	A semi quaver
Star	(*)	A gold star
Clock	(o) or (O)	A clock face
Pizza	(pi) or (PI)	A slice of pizza or a whole pizza
Money	(mo) or (MO)	Coins or notes or coins and notes
Sheep	(bah) or (BAH)	A sheep
Pig	:8)	A pig's face
Sun	(#)	A shining sun
Rain Cloud	(st) or (ST)	A cloud with rain or cloud with rain drop
Umbrella	(um) or (UM)	An open umbrella
Aeroplane	(pl) or (PL)	A plane
Birthday Cake	(^)	A cake with candles
Party!	<:o)	A face wearing a party hat and blowing a party blower
Film	(~)	A roll of film or strip of film
Gift	(g) or (G)	A gift wrapped present with bow
Email	(e) or (E)	An open envelope
Phone	(t) or (T)	A hand receiver with cable
Wave	**Table 38**	A face with hand waving
Big hug	>:D<	A face with hands hugging itself

: joyn standard emoticons

14.2 Unicode Standard Emoticons for joyn

The list of required Emoji that must be graphically rendered and offered to the user, and the mapping to relevant Unicode blocks, is detailed in document : "joyn Blackbird Unicode Standard Emoji Emoticons version 1.0", available from www.gsma.com/rcs/specifications.

15 Other technical aspects

In order to provide the joyn Blackbird also some lower level functionality is needed that does not correspond directly to end user features. This *shall* be realised using the RCS 5.1 framework. This section *will* provide the applicable references

15.1 Specification References

Registration *shall* be done according to sections 2.4 and 2.13.1 of [RCC.07 RCS 5.1] and their subsections. joyn Blackbird clients *shall* support Digest and SSO/GIBA authentication and when supporting VoLTE or VoHSPA, also AKA authentication support of which is *optional* in case VoLTE/VoHSPA are not supported.

Addressing in joyn Blackbird *shall* be done as described in section 2.5 of [RCC.07 RCS 5.1].

Joyn Blackbird *shall* handle the protocols and their NAT traversal as described in section 2.8 of [RCC.07 RCS 5.1] and its subsections. For general aspects of network access in joyn Blackbird section 2.9 of [RCC.07 RCS 5.1] and its subsections *shall* be applicable with multi-device aspects being handled as described in section 2.11 of [RCC.07 RCS 5.1].

joyn Blackbird also includes support for End User Confirmation Requests as described in section 2.10 of [RCC.07 RCS 5.1].

15.2 Configuration Parameters

The parameters for IMS configuration described in section A.1.6.1 and A1.6.2 of [RCC.07 RCS 5.1] *shall* be applicable for joyn Blackbird. For a secondary device also the parameters in section A.1.9.2 of [RCC.07 RCS 5.1] *shall* be applicable.

Other parameters defined in Annex A of [RCC.07 RCS 5.1] that are not covered in the applicable subsection of the different services in joyn Blackbird are covered in following table:

Configuration parameter	Description
IMS Mode Authentication Type	Service Provider Configurable
Realm	Service Provider Configurable
Realm User Name	Service Provider Configurable
Realm User Password	Service Provider Configurable
tel or SIP URI – international	Service Provider Configurable
tel or SIP URI - for non-international format	Service Provider Configurable
Register Q-value	Not provided (i.e. the default value is used)
RCS-E ONLY APN	Service Provider Configurable

Configuration parameter	Description
ENABLE RCS-E SWITCH	Fixed Value: 1 The switch needs to be shown to enable the behaviour described in section 2.6.
END USER CONF REQ ID	Service Provider Configurable
uuid_Value	Service Provider Configurable and device dependent NOTE: when receiving a provisioning document from a legacy network, this parameter is not provided. In this case behaviour shall be as defined in section 2.4.2 of [RCC.07 RCS 5.1].
PRESENCE PROFILE	Fixed Value: 0 Social Presence is not in scope of joyn Blackbird NOTE: when receiving a provisioning document from a legacy network this parameter is provided in the Presence characteristic instead of in the SERVICES characteristic. In that case a value of 0 shall be assumed.
XCAP Root URI, XCAP Authentication user name, XCAP Authentication Secret, XCAP Authentication type, XDM CHANGES SUBSCRIPTION	Service Provider Configurable and might not be provided. In joyn Blackbird, these parameters are only relevant on a device that is enabled to use RCS-VoLTE or RCS-VoHSPA mode when available. If provided they shall be ignored by devices that do not support these modes or that are not enabled to use them.
STANDALONE MGS AUTH	Fixed Value: 0 Standalone Messaging is not in scope of joyn Blackbird NOTE: when receiving a provisioning document from a legacy network this parameter is not provided. In that case a value of 0 shall be assumed.
PNB MANAGEMENT	Not provided (i.e. the Personal Network Blacklist feature is not used in joyn Blackbird)
ALWAYS USE IMS APN	Service Provider Configurable, see also section 19.4.1

Table 39: RCS additional IMS Core/SIP related configuration parameters

15.3 Changes relevant to RCS 5.1

15.3.1 Data access for HTTP traffic

In the absence of guidance from the relevant GSMA bodies regarding the use of the IMS APN for non IMS RCS related traffic, the IMS APN shall be used to carry all the RCS traffic (including HTTP exchanges for configuration and file transfer over HTTP) when the device is configured to use the IMS APN for RCS.

When the device is configured to use the IMS APN, RCS HTTP traffic shall go over a best effort bearer.

15.4 joyn Blackbird Specific Technical Behaviour

15.4.1   Behaviour related to ALWAYS USE IMS APN configuration parameter

For a VoLTE capable device providing a solution where the RCS and VoLTE are provided through separate implementations according to the NOTE in section 2.2.1 of [RCC.07 RCS 5.1], the values of 0 and 1 for the ALWAYS USE IMS APN configuration parameter are not relevant in joyn Blackbird networks when the device is enabled to use VoLTE when available. Next to this, a value of -1 will according to [RCC.07 RCS 5.1] not be used when the device is enabled to work in VoLTE mode. Therefore in a joyn Blackbird device configured to support RCS-VoLTE or RCS-VoHSPA mode when available, the ALWAYS USE IMS APN parameter shall provide the following behaviour:

- A value of -1 will configure the device to use separate implementations for RCS and VoLTE where the RCS traffic is routed over the same connection as the internet traffic.
- A value of 0 or 1 will configure the device to use a shared implementation where RCS and VoLTE will share a registration with the exact behaviour being as defined in [RCC.07 RCS 5.1].

NOTE: When the device is not VoLTE capable or not configured to use VoLTE, behaviour for the parameter is as described in [RCC.07 RCS5.1].

15.5 Implementation Guidelines

15.5.1   FQDN resolution (Clarification)

The FQDN resolution is bearer independent and should be performed by the handset following this process:

Step 1: Auto-configuration
As part of the provisioning process using the auto configuration server, the handset gets a FQDN for the P-CSCF.

Step 2: Perform a DNS NAPT SRV query
Having obtained the destination domain name the Domain Name System (DNS) is asked to provide matching SIP Server Location Information. One or more NAPTR records may be retrieved and the calling application examines these records to find the best match based on priorities and the desired SIP protocol variant:

```
mnc001.mcc234.3gppnetwork.org. IN NAPTR  50 100 "s" "SIP+D2U"  "" _sip._udp.example.com.
mnc001.mcc234.3gppnetwork.org. IN NAPTR  90 100 "s" "SIP+D2T"  "" _sip._tcp.example.com.
mnc001.mcc234.3gppnetwork.org. IN NAPTR  90 100 "s" "SIPS+D2T" "" _sips._tcp.example.com.
```

In the above example, "D2U" indicates UDP-based SIP, "D2T" indicates TCP-based SIP, and "SIPS+D2T" indicates TCP-based encrypted SIP. The presence of these fields indicates what variations of SIP are supported on a given SIP server.

The "s" flag means the next stage is to look up an "SRV" record.

Depending on the settings in the XML provided by the auto-configuration server and the coverage (PS or Wi-Fi), the client will make the choice for the SIP access which they are going to use (SIPoUDP, SIPoTLS or SIPoTCP).

Step 3: Perform a DNS SRV query
An example set of SIP server SRV records is as follows:

```
_sip._tcp.example.com.     SRV 0 1 5060    sipserv1.example.com.
_sip._tcp.example.com.     SRV 0 2 5060    sipserv2.example.com.
_sip._udp.example.com.     SRV 0 1 5060    sipserv1.example.com.
_sip._udp.example.com.     SRV 0 2 5060    sipserv2.example.com.
_sips._tcp.example.com.    SRV 0 1 5060    sipserv3.example.com.
_sips._tcp.example.com.    SRV 0 2 5060    sipserv4.example.com.
```

For each of the variations of the SIP protocols supported the SRV records describe:

- name of the server
- which port number SIP uses and
- when there are multiple servers, the weights & priorities to allow rough load balancing.

The calling network asks the DNS for a SRV record for the host corresponding to the specific service/protocol/domain combination that was returned in Step 2.

If there are multiple records with the same service/protocol/domain combination, the caller must sort the records based on which has the lowest priority. If there is more than one record with the same priority, the RFC 2782 shall apply.

From the SRV record get the corresponding server name.

There is potential flexibility in this step for the destination operator to receive the SIP traffic on different servers depending on the desired variation of the SIP protocol, TCP, UDP, encrypted, unencrypted.

Step 4: DNS A-query
For the server name returned in Step 3, do a standard DNS lookup to finds its IP address
This is a normal "A" (address) record lookup:

```
sipserv1.example.com.          IN A    101.1.2.3
sipserv2.example.com.          IN A    101.1.2.4
```

This FQDN resolution procedure shall apply each time the network allocates a new IP address to the Device (example: handover 3G to Wi-Fi).

15.5.2   E timer duration (RFC 3261) (Recommendation)

In order to guarantee a decent user experience and RCS stack behaviour particularly when the data bearer is 2G/3G/HSPA, the E timer should be set to a significantly greater value than the T1 timer.

NOTE: UDP is used over GPRS, therefore retransmissions are very important but there are 2 different scenarios:

3. INVITE transactions:
   The IMS core network sends instantly a 100 Trying response to stop "A Timer" and avoid useless retransmissions.
4. Non INVITE transactions:
   The IMS core network as a proper B2BUA does not send a 100 Trying. Therefore Options response (takes about 6 seconds,) takes a while (2*RTT + processing time) Therefore retransmission happens based on "E Timer".

Therefore, if the E Timer is set to a value which is similar or smaller than the T1 timer (e.g. A1= 0.5s with T1=0.5s), every time an OPTIONS or MESSAGE request and the response is delayed due to a poor connection quality, there will be at least 3 retransmissions (0.5, 1.5 and 3.5 seconds after the OPTIONS is sent) before the 200OK arrives (6 seconds). This should be avoided.

15.5.3 Normalization of MSISDNs (Recommendation)

For outgoing requests no normalization is required for the To header and the Request-URI. The format detailed in section 2.5.3.1 of [RCC.07 RCS 5.1] should be used in case the number is not in international format.

Also, in an outgoing request no normalization is required for the MSISDN in From/P-Preferred-Identity since it will have been provided in the provisioning and during registration in international format already.

For incoming requests the MSISDN in From/P-Asserted-Identity will be in international format unless the international format does not exist for that number and should be matched using the same rules which are used when receiving voice calls.

To avoid issues when roaming though for content sharing it is recommended to use the entry corresponding to that number in the address book in case that is in international format rather than the received Caller-ID.

15.5.4 Instantaneous offline behaviour when offline due to a re-registration (Recommendation)

At protocol level, any request that failed with a 403 should trigger a re-register and then re-send the request. However this raises some complications in the rare case where the re-register takes long or fails completely. Since in well-behaved clients this 403 should never happen, there is a proposal to limit handling:

- Failed IM: Queue in persistent storage, send again when re-registered.
- Other requests: FT/IS/VS/group chat: Should be retried when the registration is restored with a maximum of 5 seconds. If it takes more than 5 seconds, a message shall be shown to the user suggesting to retry later.

In other words, receiving a 403 will put the client in "offline mode" temporarily until registration is restored.

15.5.5   SIP connectivity issues for Clients (Recommendation)

It was discovered that there could be problems in MNOs domestic routers if joyn clients use the same originating SIP signalling port all the time. To avoid this possible case it is recommended to use a random originating SIP signalling port of the range 1025-65535 in the joyn client implementations. If the selected port is not available, the following port number shall be assigned for this session. Mobile OS normally handle this process.

Additionally, to avoid SIP port scanners to drain devices battery or make them malfunction it is recommended that joyn clients must silently drop any SIP traffic not coming from the MNO's SBC or IMS core network (that is, the IP address to which the SIP REGISTER request was sent).

15.5.6   Avoiding to use the standard port with Android 4.0.3 and 4.0.4 (Recommendation)

There have been issues observed with Android versions 4.0.3 and 4.0.4 on some devices. In particular, SIP messages sent via large TCP segments (e.g. >512 bytes) with well-known port 5060 (inbound or outbound without TLS) could not be sent or received. Although with another port (e.g. 5062) or UDP it is possible.

Please see the descriptions of the following android issues ids:

http://code.google.com/p/android/issues/detail?id=34727

http://code.google.com/p/android/issues/detail?id=32736

To avoid this issue it is recommended on the network side to change the DNS records and network setup to use UDP and TCP with another server port, e.g. port 5062.

> NOTE: The protocols ports should be the same for UDP and TCP.

On the joyn client side it is recommended to avoid the usage of the standard port 5060 and to set another high port for outbound client connections and in the contact header for inbound connections.

15.5.7   MSRP reports (Clarification)

The client/handset should either not include the success-report request flag or to include it set to "no". When receiving a MSRP SEND request that includes a success-report flag set to "yes" a joyn Blackbird client shall generate a Success Report according to [RFC4975] immediately after sending the MSRP 200 OK response to that MSRP SEND request.

15.5.8   Clarification on Byte-Range header field (Clarification)

As per RFC 4975 it is not mandatory to include a Byte-Range header field into the first chunk of the MSRP message. When receiving an MSRP SEND request that includes a success-report flag set to "yes" a joyn Blackbird client shall generate a Success Report according to RFC 4975 immediately after sending the MSRP 200 OK response to that MSRP SEND request.

15.5.9   Use of separate IMS stacks for RCS and VoLTE (Clarification)

The note on VoLTE devices using a separate stack for RCS defined in section 2.2.1 of [RCC.07 RCS 5.1] is applicable to joyn Blackbird for a limited time. Exact timing shall be clarified through implementation guidelines or similar communication.

15.5.10 Improve video starting time (Clarification)

In order to improve the video start time joyn Blackbird clients *shall* do the following:

A joyn Blackbird device that is about to receive a Video Stream *shall* when sending empty packets instead of using STUN send dummy RTP and RTCP packets described in section 2.8.1 of [RCC.07 RCS 5.1] at a high rate (*recommended* rate: 50 to 100ms) from the moment the SIP INVITE request is received (or the 180 RINGING is sent) in bursts sent regularly (a 1 second burst every 15 seconds is recommended). This shall be done until one of the following conditions is met:

- the first RTP packet of the Video Stream is received or
- the client starts streaming itself in case of a bi-directional RTP stream or a final response is sent on the SIP INVITE request. In case this final response is a 200 OK response, the client shall continuously send the dummy RTP packets until either the first RTP packet of a Video Stream is received or the client starts streaming itself in case of a bi-directional RTP stream.

Once the first RTP packet is received the dummy packets *shall* be sent at a lower rate (a transmission every 15 sec is *recommended*) for the remainder of a uni-directional session or not at all in case the RTP stream is bi-directional.

- If the first frame is not an I-Frame or NAL unit carrying a Sequence Parameter Set (SPS) or Picture Parameter Set (PPS), the receiving client shall send a RTCP FIR request (see RFC5104, section 4.3.1) to the sender
- When receiving an RTCP FIR request, the sender will reset the encoder as specified in RFC5104 and send SPS, PPS (if not provided in the SDP) and an I-Frame to the receiver

Annex A   Document Management

A.1   Document History

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
1.0	03 May 2013	Approved at PSMC	PSMC#112	Mark Hogan
1.1	05 August 2013	Update on Group Chat		David O´Byrne / Thomas Welzel
2.0	August 2013	Submitted to DAG and PSMC for approval	RCC/PSMC	David O´Byrne / Thomas Welzel
3.0	Jan 2014	Updated abbreviations, service activation, contacts handling, Fully Integrated messaging, joyn setting (removed master switch and included an instance switch), joyn states and roaming sections. Replaced VoIP with Wi-Fi Voice service, updated P2P Video call section	RCS Product Group	Wadé Owojori
4.0	Oct 2014	Updated to remove the following services: -Converged Messaging -Geolocation push -vCard -Wi-Fi Voice -RCS IP Video call Clarification provided on how to implement the requirements for a master switch.	RCS Product Group	Wadé Owojori

Other Information

Type	Description
Document Owner	Future Communications Program, RCS Product Team
Editor / Company	M. Hogan, S.Longhurst, T. Van Pelt, D. O'Byrne, W. Owojori / GSMA

It is our intention to provide a quality product for your use. If you find any errors or omissions, please contact us with your comments. You *may not*ify us at prd@gsma.com

Your comments or suggestions & questions are always welcome.