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Technical Specification

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Universal Mobile Telecommunications System (UMTS);
LTE;
Messaging service using the IP Multimedia (IM)
Core Network (CN) subsystem;
Stage 3
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ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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1 Scope

The present document provides the protocol details for the messaging service within the IP Multimedia CN Subsystem (IMS) based on the Session Initiation Protocol (SIP), the Session Description Protocol (SDP) and, the Message Session Relay Protocol (MSRP) . The document covers immediate messaging, session based messaging and session-based messaging conferences, as described in 3GPP TS 22.340.

Where possible the present document specifies the requirements for this protocol by reference to specifications produced by the IETF within the scope of SIP, SDP and, MSRP, either directly, or as modified by 3GPP TS 24.229.

The present document is applicable to Application Servers (ASs) , Media Resource Function Controllers (MRFCs), Media Resource Function Processors (MRFPs) and to User Equipment (UE) providing messaging capabilities.

This document does not cover the signalling between a MRFC and a MRFP.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
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[1] 3GPP TR 21.905: "3G Vocabulary".

[2] 3GPP TS 22.228: " Service requirements for the Internet Protocol (IP) multimedia core network subsystem; Stage 1".

[3] 3GPP TS 23.218: "IP Multimedia (IM) Session Handling; IP Multimedia (IM) call model; Stage 2".

[4] 3GPP TS 24.228 Release 5: "Signalling flows for the IP multimedia call control based on SIP and SDP; Stage 3".

[5] 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on SIP and SDP; Stage 3".

[6] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[7] IETF RFC 3261 (March 2002): "SIP: Session Initiation Protocol".

[8] IETF RFC 3428 (December 2002): "Session Initiation Protocol (SIP) Extension for Instant Messaging".

[9] IETF RFC 4975 (September 2007): "The Message Session Relay Protocol (MSRP)".

[10] 3GPP TS 24.147: "Conferencing using the IP Multimedia (IM) Core Network (CN) subsystem; Stage 3".

[11] 3GPP TS 22.340: "IP Multimedia System (IMS) messaging; Stage 1".

[12] IETF RFC 5365 (October 2008): "Multiple-Recipient MESSAGE Requests in the Session Initiation Protocol (SIP)".

[13] IETF RFC 3994 (January 2005): "Indication of Message Composition for Instant Messaging".

[14] 3GPP TS 26.141 "IP Multimedia System (IMS) Messaging and Presence; Media formats and codecs".

[15] draft-ietf-mmusic-file-transfer-mech-00.txt (December 2006):"A Session Description Protocol (SDP) Offer/Answer Mechanism to Enable File Transfer".

Editor's note: The above document cannot be formally referenced until it is published as an RFC.

[16] IETF RFC 5360 (October 2008): " A Framework for Consent-Based Communications in the Session Initiation Protocol (SIP)".

[17] 3GPP2 C.S0050-B: "3GPP2 File Formats for Multimedia Services".

[18] draft-ietf-simple-msrp-acm-00.txt (January 2009): "An Alternative Connection Model for the Message Session Relay Protocol (MSRP)".

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3 Definitions, symbols and abbreviations

3.1 Definitions

IsComposing information This is a term used to indicate that an indication is sent to the communicating user when a user in entering a new message.

For the purposes of the present document, the following terms and definitions given in 3GPP TS 22.340 [11] apply:

Immediate messaging

Session based messaging

Session based messaging conferences

For the purposes of the present document, the [following] terms and definitions given in RFC 4975 [9] apply:

Host

Page-mode messaging

Session inactivity timer

Session-mode messaging

Session-mode messaging conferences

Visitor

For the purposes of the present document, the following terms and definitions given in 3GPP TS 24.147 [10] apply:

Conferencing Application Server

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AS Application Server
CN Core Network
DM Data manipulator
DMS Data manipulation server
IM IP Multimedia

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IMS	IP Multimedia CN subsystem
IP	Internet Protocol
MRFC	Media Resource Function Controllers
MRFP	Media Resource Function Processors
MSRP	Message Session Relay Protocol
SBLP	Service Based Local Policy
SDP	Session Description Protocol
SIP	Session Initiation Protocol
UE	User Equipment
URL	Uniform Resource Locator

4 Messaging overview

The basic services for the IP Multimedia core network Subsystem (IMS), as defined in 3GPP TS 24.229 [5], allow a user to initiate, modify and terminate media sessions using the Session Initiation Protocol, as defined in RFC 3261 [7]. Although these basic mechanisms already allow the exchange of instant messaging information using SIP, this functionality can be extended to provide a richer service within the IMS.

The messaging service within the IM CN subsystem provides the means for a user to send or receive single messages immediately to / from another user and to create and participate in a messaging conference with one ore more other users. Participants to such message based communication may be internal or external to the home network.

When to use an immediate message and when to use a session-based messaging session will depend on the application.

NOTE: Some participants may always use session-based messaging, while others may use immediate messaging or a combination of session-based messaging and immediate messaging dependant of the characteristics of the messaging session. The criteria are implementation and application specific.

For immediate messaging the procedures for page-mode messaging, as defined in RFC 3428 [8] or for session-mode messaging, as defined in RFC 4975 [9] and draft-ietf-simple-msrp-acm [18] are utilized. When to use an page-mode messaging and when to use session-mode messaging session for the purpose of immediate messaging will depend on the application.

For session-based messaging and session-based messaging conferences, the Message Session Relay Protocol (MSRP) is utilized to transport messages.

The architecture for the 3GPP messaging is specified in 3GPP TS 23.228 [6] and 3GPP TS 23.218 [3]. The 3GPP recommended media formats and codecs are specified in 3GPP TS 26.141 [14]. The 3GPP2 recommended media formats and codecs are specified in 3GPP2 C.S0050-B [17].

The functional split for session-mode messaging between an AS, MRFC and MRFP is that same as that described in clause 4 in 3GPP TS 24.147 [10] for SIP based conferences. The functional split between the AS, MRFC and MRFP for page-model messaging is out of scope of the present document.

5 Protocol using SIP for page-mode messaging

5.1 Introduction

5.1.1 Sending immediate message to multiple recipients

The UE may be able to send a single immediate message to multiple recipients by including in the MESSAGE request the list of URIs (i.e., URI-list) that identify the intended recipients.

The UE shall create a MESSAGE request in accordance with 3GPP TS 24.229 [5], and it shall also include a multipart body in the MESSAGE request. The Request-URI shall be set to the SIP URI of the Application Server that implements the role of the List Server. The multipart body shall contain the body carrying the URI-list (in the XML format) whose Content-Disposition type is 'recipient-list', and the body that contains the immediate message payload as specified in the RFC 5365 [12].

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The handling of the received response shall be in accordance with 3GPP TS 24.229 [5].

5.2 Functional entities

5.2.1 User Equipment (UE)

For the purpose of page-mode messaging, the UE shall implement the role of a Participant as described in subclause 5.3.1.

5.2.2 Application Server (AS)

As the functional split for the purposes of page mode messaging between the AS and the MRFC is out of scope of the present document, the procedures are described for a combined AS and MRFC. The AS and MRFC may either be collocated, or interoperate using a proprietary protocol and a proprietary functional split.

For the purpose of page-mode messaging, an Application Server may implement the role of a List Server as described in subclause 5.3.3. An Application Server may implement the role of a Participant as described in subclause 5.3.1

5.2.3 Media Resource Function Controller (MRFC)

As the function split for the purposes of page mode messaging between the MRFC and the AS is out of scope of the present document, the procedures for the MRFC are described together with those for the AS in subclause 5.2.2.

5.3 Role

5.3.1 Participant

5.3.1.1 General

For the purpose of page-mode messaging a participant will send a page-mode message using a SIP MESSAGE request as defined in RFC 3428 [8] to another participant.

5.3.1.2 Sending of an immediate message

When sending an page-mode message to another participant or to a list server, the participant shall construct and send a MESSAGE request in accordance with RFC 3428 [8] and subclause 5.1.2A.1 of 3GPP TS 24.229 [5].

The participant may include in a MESSAGE request an isComposing status message as defined in RFC 3994 [13].

The participant shall stop transmitting isComposing status messages if the participant receives a 415 (Unsupported Media Type) status code in a response to a MESSAGE request containing the status indication.

The Request URI shall either be:

- the URI of the other participant; or
- a PSI identifying a group.

5.3.1.3 Receiving an immediate message

Upon receipt of a MESSAGE request, the participant shall perform the procedures as described in RFC 3428 [8] and subclause 5.1.2A.2 of 3GPP TS 24.229 [5].

NOTE: A MESSAGE request can be used for applications other than immediate messaging (e.g. 3GPP TS 23.228 [6] subclause 5.4.9), and the handling of received MESSAGE requests for such applications is outside the scope of this specification.

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5.3.1.4 Consent to list server distribution

A participant capable of receiving message requests should support the requirements of a recipient defined in RFC 5360 [16].

5.3.2 Application Server (AS)

5.3.2.1 Receiving an immediate message for unregistered Public User Identity

When an immediate message destined for an unregistered Public User Identity arrives at the user's home network, the I-CSCF and S-CSCF perform the actions as specified in 3GPP TS 24.229 [5].

If the Public User Identity has services related to unregistered state activated (i.e., hold the MESSAGE request temporarily in the network.), the MESSAGE request will be routed to an AS, which processes the request further on. The AS may then hold the MESSAGE request and deliver the MESSAGE request when either the UE becomes reachable or the validity of the message expires as specified in RFC 3428 [8].

5.3.3 List Server

5.3.3.1 List server originating case

In addition to the procedure specified in subclause 5.3.3.2 the list server shall follow the procedures of 3GPP TS 24.229 [5] subclause 5.7.3 when acting as an originating UA.

The PSI is used to address a predefined list of URIs.

The list server shall send a MESSAGE request to each of the entries in the predefined URI list. For each of MESSAGE requests the list server shall populate the header fields as follows:

a) the Request URI header fields set to the URI of one of the entries of the predefined URI list;

b) the From header field set to the same value as the From header field (excluding the "tag" parameter) that was received in the incoming MESSAGE request;

c) the To header fields set to the same value as the To header field that was received in the incoming MESSAGE request;

d) the P-Charging-Vector header that includes:

1) the value of the icid parameter if available; and

2) the value of the orig-ioi parameter if available;

e) the P-Charging-Function-Addresses header containing the values received in the incoming MESSAGE request or, if the P-Charging-Function-Addresses header was not received in the incoming MESSAGE request, indicate the values applicable for the list server in the P-Charging-Function-Addresses header; and

f) the P-Asserted Identity header and Privacy header containing the values received in the MESSAGE request;

The handling of the 200 (OK) response shall be in accordance with 3GPP TS 24.229 [5].

5.3.3.2 List server terminating case

Upon receipt of a MESSAGE request that includes a PSI in the request URI the list server shall:

1) check if the PSI is allocated to a predefined URI list and rejects the request in accordance with RFC 3261 [7] if it is not allocated. The following actions in this subclause shall only be performed if the distribution list URI is allocated;

2) verify the identity of the user as described in subclause 5.7.1.4 of 3GPP TS 24.229 [5] and authorize the request as described in subclause 5.7.1.5 of 3GPP TS 24.229 [5]. The following actions in this subclause shall only be performed if the request can be authorized;

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3) create a 202 (Accepted) response. The response shall be in accordance with the procedures of 3GPP TS 24.229 [5] subclause 5.7.1.2 in relation to the contents of the P-Charging-Function-Addresses header and the P-Charging-Vector header; and :

   a) include the P-Charging-Vector header including:

      i) the value of the icid parameter as received in the MESSAGE request;

      ii) the value of the orig-ioi parameter as received in the MESSAGE request; and

      iii) the term-ioi parameter, indicating the network of the list server; and

   b) include the P-Charging-Function-Addresses header as received in the MESSAGE request or, if the P-Charging-Function-Addresses header was not received in the MESSAGE request, indicate the values applicable for the list server in the P-Charging-Function-Addresses header; and

4) send the 202 (Accepted) response.

5.3.3.3 List Server processing the MESSAGE URI-list

Upon receiving the MESSAGE request with the URI-list included in the multipart body, the List Server shall inform the UE that it has received the MESSAGE request by returning the 202 (Accepted) response. Subsequently, the List Server shall create a MESSAGE request for each intended recipient listed in the URI-list, and it shall insert the immediate message payload into the body of each outgoing MESSAGES request.

When creating the outgoing MESSAGE requests destined for each recipient, the List Server shall follow the procedures described in the 3GPP TS 24.229 [5]. The List Server shall populate the header fields of each outgoing MESSAGE request as follows:

- the Request-URI set to the SIP URI of the intended recipient;
- the From header field set to the same value as the From header field that was received in the incoming MESSAGE request;
- the To header set to the SIP URI of the intended recipient; and
- the remaining headers set to the values as specified in 3GPP TS 24.229 [5] subclause 5.7.3.

The List Server shall also compose the multipart body of the outgoing MESSAGE request as specified in the RFC 5365 [12], and included it in the outgoing MESSAGE request.

When sending the MESSAGE request to each recipient, and processing the respective responses, the List Server shall behave as specified in the 3GPP TS 24.229 [5] subclause 5.7.

5.3.3.4 List server support of MESSAGE URI-lists

A list server shall support the relay requirements of RFC 5360 [16]. The list server may also support the store and forward server requirements of RFC 5360 [16].

6 Protocol using SIP for session-mode messaging

6.1 Introduction

6.2 Functional entities

6.2.1 User Equipment (UE)

For the purpose of session-mode messaging, the UE shall implement the role of a Participant as described in subclause 6.3.1.

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6.3 Role

6.3.1 Participant

6.3.1.1 General

The participant shall perform SIP related session procedures in accordance with 3GPP TS 24.229 [5] to set up the dialog used for session-based messaging.

6.3.1.2 Session initiation - mobile originating case

When the originating participant wishes to engage the terminating participant in a session-mode message session, it shall use the call initiation procedure specified in 3GPP TS 24.229 [5]. The Request URI header shall include the URI of the terminating participant.

6.3.1.3 Session initiation - mobile terminating case

When the terminating participant receives an initial INVITE request from the originating endpoint proposing a message session, the terminating participant shall apply the procedures as specified in 3GPP TS 24.229 [5].

6.3.2 Intermediate Node

6.3.2.1 General

The intermediate node shall act as a Routeing B2BUA as specified in subclause 5.7 in 3GPP TS 24.229 [5].

6.3.2.2 Generic procedures for all methods at the intermediate node

6.3.2.2.1 Intermediate node – originating case

The intermediate node shall follow the procedures of 3GPP TS 24.229 [5] subclause 5.7.3 when acting as an originating UA.

6.3.2.2.2 Intermediate node – terminating case

Upon receipt of an initial request the intermediate node shall follow the procedures of 3GPP TS 24.229 [5] subclause 5.7.1.2 in relation to the contents of the P-Charging-Function-Addresses header and the P-Charging-Vector header.

When creating the first response for this initial request, the intermediate node shall:

1) include the P-Charging-Vector header including:

   a) the value of the icid parameter as received in the initial request; and

   b) the value of the orig-ioi parameter as received in the initial request; and

   c) the term-ioi parameter, indicating the network of the intermediate node; and

2) include the P-Charging-Function-Addresses header as received in the initial request or, if the P-Charging-Function-Addresses header was not received in the initial request indicate the values applicable for the conference in the P-Charging-Function-Addresses header.

When creating responses for an initial INVITE request, the intermediate node shall additionally send the 200 (OK) response to the initial INVITE request only after the resource reservation has been completed.

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