CPM Interworking Function

Candidate Version 2.1 – 09 Feb 2016

Open Mobile Alliance

OMA-TS-CPM_Interworking_Function-V2_1-20160209-C

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1. Scope

This document provides the technical specifications for the interworking functionality of the CPM Enabler. The document covers the interworking selection procedures and the principles of interworking of CPM Standalone Messages, CPM disposition notifications, CPM File Transfers and CPM Sessions with Non-CPM Communication Services. The technical specifications are designed to fulfil the requirements, architecture and system concepts that are described in [OMA-CPM-RD], [OMA-CPM-AD] and [OMA-CPM-SD]. As such, these technical specifications provide the formal definitions of the CPM-IW1 and CPM-IW2 interfaces that have been identified in [OMA-CPM-AD]. Also, these technical specifications formally define the expected behaviour of the ISF and Interworking Function components that have been identified in [OMA-CPM-AD].

This version of the document specifies the interworking with:

- SMS;
- MMS;
- e-mail.

NOTE: CPM interworking with other Non-CPM Communication Services is possible but the specific adaptations towards these other Non-CPM Communication Services are not described in this version of the document.

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3. Terminology and Conventions

3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

CPM Address	See [OMA-CPM-RD].
CPM Ad-hoc Group	See [OMA-CPM-RD].
CPM Chat Message	See [OMA-CPM-RD].
CPM Client	See [OMA-CPM-AD].
CPM Contribution Identity	See [OMA-CPM-SD].
CPM Controlling Function	See [OMA-CPM-AD].
CPM Conversation Identity	See [OMA-CPM-SD].
CPM Feature Tag	See [OMA-CPM-SD].
CPM File Transfer	See [OMA-CPM-RD].
CPM Message	See [OMA-CPM-RD].
CPM Participating Function	See [OMA-CPM-AD].
CPM Pre-defined Group	See [OMA-CPM-RD].
CPM Session	See [OMA-CPM-RD].
CPM Session Invitation	See [OMA-CPM-RD].
CPM Standalone Message	See [OMA-CPM-RD].
CPM User	See [OMA-CPM-RD].
ENUM	Telephone number mapping standard (E.164 NUmber Mapping) as defined in [RFC3761].
Interworking Function	See [OMA-CPM-AD].
Interworking Selection Function	See [OMA-CPM-AD].
Large Message Mode	See [OMA-CPM-AD].
Media	See [OMA-CPM-RD].
Media Plane	See [OMA-CPM-AD].
Media Type	See [OMA-DICT].
Non-CPM Communication Service	See [OMA-CPM-RD].
Non-CPM Communication Service Identifier	See [OMA-CPM-SD].
Pager Mode	See [OMA-CPM-AD].

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3.3 Abbreviations

CPIM	Common Presence and Instant Messaging
CPM	See [OMADICT]
CS	Circuit Switch (2G)
DNS	See [OMADICT]
ENUM	E.164 NUmber Mapping
ESME	External Short Message Entity
IMDN	See [OMADICT]
IP	See [OMADICT]
IP-SM-GW	See [OMADICT]
ISF	See [OMADICT]
IWF	See [OMADICT]
MIME	See [OMADICT]
MMS	See [OMADICT]
MMS R/S	Multi Media Service Relay/Server
MSRP	See [OMADICT]
OMA	See [OMADICT]
PS	Packet Switch
SDP	See [OMADICT]
SIP	See [OMADICT]
SM	Short Messages
SMIL	See [OMADICT]
SMPP	Short Message Peer to Peer protocol
SMS	See [OMADICT]
SM-SC	Short Message Service Centre
SMTP	See [OMADICT]
TCP	Transmission Control Protocol
XML	See [OMADICT]

Note: Abbreviations defined in the OMA Dictionary complements this section.

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4. Introduction

The CPM interworking functionality allows CPM Users to communicate with users that do not have the possibility to use CPM as their communication service. It also allows CPM Users to continue to communicate when their network conditions are such that CPM connectivity is not possible or desirable.

The CPM interworking functionality ensures that CPM Standalone Messages, CPM File Transfers, CPM Sessions and CPM disposition notifications are delivered towards a Non-CPM Communication Service and supports that messages, file transfers, sessions and disposition notification from the Non-CPM Communication Service that are targeted towards CPM Users are delivered within the CPM domain.

NOTE: The CPM interworking functionality will only support the interworking of features of a Non-CPM Communication Service towards CPM that are actually supported by the Non-CPM Communication Service, (e.g., if the Non-CPM Communication Service does not support sessions or file transfers these will not be interworked from non-CPM to CPM). For the direction of interworking from CPM to a Non-CPM Communication Service it is left to this specification and, for Non-CPM Communication Services other than SMS, MMS, and e-mail, to non-standardized interworkings which CPM features to map or not.

The interworking functionality of CPM is executed in three stages:

1. Interworking decision: this is where it is decided that interworking is to occur. The interworking decision procedures are described in [OMA-CPM-TS-Conv-Func].
2. Interworking selection: this is where it is decided to which Non-CPM Communication Service to interwork to. The interworking selection procedures are specified in section 5 "*Procedures at Interworking Selection Function*".
3. Interworking execution: this is where the actual interworking occurs and CPM requests are translated into non-CPM requests and vice-versa. The interworking execution procedures are specific in section 6 "*Procedures at Interworking Function*".

For interworking from a Non-CPM Communication Service towards CPM, it is left unspecified how the Non-CPM Communication Service decides whether to interwork towards CPM or not. However, the interworking execution is described in section 6 "*Procedures at Interworking Function*".

More information on the CPM interworking functionality can be found in the CPM Requirements Document [OMA-CPM-RD], the CPM Architecture Document [OMA-CPM-AD] and the CPM System Description [OMA-CPM-SD].

4.1 CPM Version 1.0

Version 1.0 of this document covers the following functionality and procedures:

- The interworking selection process of the ISF for the selection of an appropriate Non-CPM Communication Service to interwork CPM Standalone Messages, CPM File Transfers, CPM Sessions and CPM disposition notifications.
- The generic procedures an IWF has to implement to be able to interwork CPM Standalone Messages, CPM File Transfers, CPM Sessions and CPM disposition notifications towards a Non-CPM Communication Service.
- The specific procedures an IWF has to implement to be able to interwork CPM Standalone Messages, CPM File Transfers, CPM Sessions and CPM disposition notifications towards:
    - SMS,
    - MMS,
    - e-mail.

NOTE 1: For SMS, MMS and e-mail to CPM interworking only the interworking of messages and message disposition notifications towards CPM is supported. For the other direction, i.e., for CPM to SMS, MMS or e-mail interworking, this specification details which CPM features are interworked.

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NOTE 2: The above generic and specific procedures can be used to derive additional specific procedures for interworking towards Non-CPM Communication Services other than SMS, MMS, or e-mail. Such additional mappings are left to deployments or later releases of CPM.

4.2 CPM Version 2.0

Version 2.0 of this document covers the following functionality and procedures:

- Interworking towards [OMA-SIMPLE-IM].

4.3 CPM Version 2.1

Version 2.1 of this document covers the following new functionality and procedures:

- In support of a single messaging delivery logic in the CPM PF, the IWF added the following capabilities:
    - When an interworked delivery to SMS failed, it can monitor when the CPM User is registered in CS domain and is SMS capable, so that it can inform the CPM PF via CPM interworking events (using CPM Event Framework);
    - When an interworked delivery to SMS or MMS was successful, the IWF provides the following interworking information to the CPM PF for storage in to the CPM Message Store:
        - The legacy technology used for interworking,
        - Any additional correlation information needed;
- Support in ISF to generate, cache and provide to IWF and CPM PF, the unique interworking numbers allocated to interworking CPM Group Sessions to SMS or MMS;
- Support in the IWF to receive and reuse the same unique interworking number when interworking a Long-Lived GC Session to legacy (SMS, MMS), to support a better service experience for the CPM User when receiving group chat messages from a Long-Lived GC via interworking or via CPM.

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5. Procedures at Interworking Selection Function

The main function of the ISF is to select the Non-CPM Communication Service to which a CPM Standalone Message, a CPM Standalone Message disposition notification, a CPM File Transfer or a CPM Session needs to be interworked. The ISF bases its selection decision on a number of input criteria.

5.1 Non-CPM Communication Service Selection

When selecting a Non-CPM Communication Service to interwork to, the ISF:

1. SHALL check service provider policies to determine if interworking to a particular Non-CPM Communication Service is not allowed, and if so, eliminate the IWF associated with the Non-CPM Communication Service from the list of potential IWFs to be selected;

2. If interworking is occurring in the terminating network, SHALL check service provider policies to determine if interworking to a particular Non-CPM Communication Service is allowed for this particular target user, and if not, eliminate the IWF associated with the Non-CPM Communication Service from the list of potential IWFs to be selected;

3. For each remaining IWF, SHALL check if the CPM originator already has or can be assigned during interworking a routable non-CPM user address. If there is no routable address assigned to the CPM originator for any Non-CPM Communication Service, the ISF SHALL reject the CPM request with an error response;

4. SHALL bypass the remaining steps if a CPM Standalone Message disposition notification that needs to be interworked is accompanied by a Non-CPM Communication Service Identifier, as defined in Appendix D, and SHALL deliver the disposition notification via the indicated IWF;

5. SHALL use the characteristics of the CPM Standalone Message, of the CPM File Transfer or of the CPM Session to influence the selection of an appropriate IWF;

   NOTE 1: The characteristics relate to factors like message size and media attached for CPM Standalone Messages, content type of the transferred file for CPM File Transfers or media, size and content type for CPM Sessions used.

   NOTE 2: In the case of interworking large CPM Standalone Messages (e.g., 560 bytes or more) or CPM File Transfers to Non-CPM, it is better not to select SMS Interworking to prevent deterioration of the SMS user's experience. For the other direction of interworking (i.e., Non-CPM to CPM), it may be appropriate though to interwork a set of concatenated SMS'es to a large CPM Standalone Message.

6. SHALL, if allowed by service provider policies, use the Non-CPM Communication Service Identifier that may be part of the destination address, as defined in Appendix D to influence the selection of an appropriate IWF;

7. If interworking is occurring in the terminating network, the ISF MAY check the target user's preferences retrieved from XDMS to determine if the CPM User has indicated a preferred delivery mechanism (e.g., SMS, MMS, e-mail). In this case, the ISF SHALL use this information to influence the selection of an appropriate IWF;

   a. For Long-lived CPM Group Sessions interworking to SMS or MMS, it SHALL determine if a previous interworking of that CPM Group Session already had allocated and used a unique interworking number, associating that Long-lived CPM Group Session with the CPM User, as follows;

      i. SHALL extract the CPM Group Session Identity from the From SIP Header field;

      ii. SHALL extract the Conversation-ID and Contribution-ID SIP header fields;

      iii. SHALL extract the recipient's address from the Request-URI; and

      iv. SHALL use the information extracted above to determine if an associated unique interworking number was already allocated to the Long-lived CPM Group Session;

      v. If an associated unique interworking number is found:

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1. it SHALL indicate it to the selected IWF by populating the IW-Number SIP header field defined in Appendix C of [OMA-CPM-TS-Conv-Func] with the value of the unique interworking number allocated, to be further used for interworking of the CPM Chat Messages belonging to this Long-lived CPM Group Session (i.e. upon being restarted by a Participant);

vi. otherwise:

1. it SHALL allocate and cache an interworking number that associates the CPM User with that CPM Group Session (i.e. the CPM User Authenticated Address, the Conversation-ID, Contribution-ID and the CPM Group Session Identity), and SHALL provide it to the selected IWF (SMS or MMS) by populating the IW-Number SIP header field defined in Appendix C of [OMA-CPM-TS-Conv-Func] with the value of the unique interworking number allocated.

vii. SHALL populate the P-Asserted-Identity SIP header field with the value of the unique interworking number allocated to the CPM Group Session, so that IWF can further map it to the appropriate non-CPM technology headers.

8. MAY, if available, interact with the Presence enabler [OMA-Presence] to request the target user's presence information, relative service preference as described in section 7.15 *"Relative Service Preference"* of [OMA-DDS-Presence_Data], and, if obtained, analyze the most preferred service from the presence information. In this case, the ISF SHALL use this information to influence the selection of an appropriate IWF.
9. SHALL use the information compiled in steps 1, 2, 3, 5, 6, 7, and 8 to select the most appropriate IWF.
   NOTE 3: Further detail on the selection process can be found in Appendix D of [OMA-CPM-SD].
10. SHALL send the CPM request to the selected IWF, without involvement of the SIP/IP core;
11. If handing over the CPM Standalone Message, CPM File Transfer or CPM Session results in an error response, the ISF, based on service provider policies,
    a. SHALL determine whether re-selection is allowed, and if re-selection is not allowed, send the error response received from the IWF towards the originating CPM Client and end this procedure; otherwise
    b. SHALL exclude the IWFs attempted so far from the list of potential IWFs to be selected;
    c. SHALL re-perform the selection and repeat interworking attempt as specified in steps 1 to 10 above;
    d. If no other IWF is available for interworking, SHALL send a SIP 488 "Not Acceptable Here" error response towards the originating CPM Client.

    NOTE 4: CPM Standalone Message disposition notifications are not submitted to re-attempts via alternative interworkings.
12. Upon receiving a SIP 200 "OK" response for the CPM Standalone Message, CPM Standalone Message disposition notification, CPM File Transfer or CPM Session Invitation from the IWF, the ISF SHALL forward the SIP 200 "OK" to the entity that sent the CPM request towards the ISF (e.g., CPM Participating Function), without involvement of the SIP/IP core. For CPM Group Sessions, if the IW-Number SIP header field was present in the SIP 200 "OK" from IWF, the ISF SHALL preserve it in the response sent further, otherwise if not present, it SHALL add it and set it to the value of the associated unique interworking number for that CPM Group Session.
13. In the case of interworking a CPM Session, a CPM File Transfer or a Large Message Mode CPM Standalone Message:
    a. Upon receiving a SIP ACK request from the entity that sent the initial SIP INVITE request (e.g., the CPM Participating Function), the ISF SHALL forward the SIP ACK request to the selected IWF, without involvement of the SIP/IP core;
    b. Upon receiving a SIP BYE request from the entity that sent the initial SIP INVITE request (e.g., the CPM Participating Function), the ISF SHALL forward the SIP BYE request to the selected IWF, without involvement of the SIP/IP core;

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c. Upon receiving a SIP BYE request from the selected IWF, the ISF SHALL forward the SIP BYE request to the entity that sent the initial SIP INVITE request (e.g., the CPM Participating Function), without involvement of the SIP/IP core.

14. In the case of interworking a CPM disposition notification that does not contain a Non-CPM Communication Service Identifier, the ISF SHALL reject the disposition notification.

5.2 Interworking to a Long-lived CPM Group Session

For Long-lived CPM Group Sessions, the ISF SHALL keep the association of the unique interworking number allocated to the Long-lived CPM Group Session based on the combination of:

a) the served CPM User's Authenticated Address, and

b) the Long-lived CPM Group Session's Conversation-ID, and

c) the Long-lived CPM Group Session's Contribution-ID, and

d) the Long-lived CPM Group Session's CPM Group Session Identity.

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6. Procedures at Interworking Function

NOTE: Throughout sections 6.2, 6.3, and 6.4 many tables contain a "(Value) Status" column. The content of entries in that column is either: Mandatory, Optional, or Conditional. These values were derived from the normative references referred to in the mapping tables, and are with respect to the parameter to be mapped to. This status is not an indication of whether a certain translation is optional or mandatory; all translations are considered to be mandatory unless stated otherwise.

6.1 General Principles

The purpose of the IWF is to interwork CPM Standalone Messages, CPM disposition notifications, CPM File Transfers and CPM Sessions from the CPM environment to Non-CPM Communication Services and to interwork messages, disposition notifications, file transfers and sessions from the Non-CPM Communication Services to the CPM environment.

When interworking CPM Standalone Messages, the IWF SHALL ignore CPIM headers and formatting [RFC3862] and recipient-list-body [RFC5366] of the received CPM Standalone Message when mapping the message contents to a format suitable for the Non-CPM Communication Service.

In general, the handling of CPM requests in the Interworking is as follows:

- When the IWF receives a Pager Mode CPM Standalone Message (i.e., a SIP MESSAGE request containing the CPM Feature Tag “3gpp-service.ims.icsi.oma.cpm.msg”), it SHALL handle this Pager Mode CPM Standalone Message as defined in section 6.1.1 “*Pager Mode CPM Standalone Message Handling*”.
- When the IWF receives a Large Message Mode CPM Standalone Message (i.e., a SIP INVITE request containing the CPM Feature Tag “3gpp-service.ims.icsi.oma.cpm.largemsg”), it SHALL handle this Large Message Mode CPM Standalone Message as defined in section 6.1.2 “*Large Message Mode CPM Standalone Message Handling*”.
- When the IWF receives a CPM File Transfer (i.e., a SIP INVITE request containing the CPM Feature Tag “3gpp-service.ims.icsi.oma.cpm.filetransfer”), it SHALL handle this CPM File Transfer as defined in section 6.1.3 “*CPM File Transfer Handling*”.
- When the IWF receives a CPM Session Invitation (i.e., a SIP INVITE request containing the CPM Feature Tag “3gpp-service.ims.icsi.oma.cpm.session”), it SHALL handle this CPM Session as defined in section 6.1.4 “*CPM Session Invitation Handling*”, section 6.1.5.1 “*CPM Session Media Handling*”, section 6.1.5 “*CPM Session Modification Handling”*, and section 6.1.6 “*CPM Session ”*.

6.1.1 Pager Mode CPM Standalone Message Handling

Upon receiving a SIP MESSAGE request with the CPM Feature Tag “3gpp-service.ims.icsi.oma.cpm.msg” from the ISF, the IWF:

1. SHALL check if the Content-Type(s) is acceptable to the IWF. If not, reject the request with a 415 “Unsupported Media Type” response as defined in [RFC3261].
2. SHALL handle the received SIP headers according to rules and procedures in [RFC3428] with the following clarification:
   a. SHALL store the Conversation-ID and Contribution-ID headers as defined in Appendix C of [OMA-CPM-TS-Conv-Func] and the Expires header;
   b. MAY store the CPIM headers for IMDN defined in [RFC5438] if present.
3. SHALL convert the received SIP MESSAGE request into the appropriate non-CPM message based on the conversion rules as defined for each Non-CPM Communication Service. See sections 6.2, 6.3, and 6.4 for mapping towards SMS, MMS and e-mail respectively.
   NOTE: Depending on the Non-CPM Communication Service, some of the CPM specific headers may be mapped into a specific header of the non-CPM message.

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4. SHALL send the non-CPM message towards the corresponding Non-CPM Communication Service.

Upon receiving the response from the Non-CPM Communication Service, the IWF SHALL handle the response according to the Non-CPM Communication Service. See sections 6.2, 6.3, and 6.4 for SMS, MMS and e-mail respectively.

The IWF MAY respond to the SIP MESSAGE request with either a SIP 202 “Accepted” or a SIP 408 “Request Timeout” response prior to receiving a response from the Non-CPM System, depending on service provider policies.

6.1.2 Large Message Mode CPM Standalone Message Handling

Upon receiving a SIP INVITE request with the CPM Feature Tag “3gpp-service.ims.icsi.oma.cpm.largemsg”, the IWF:

1. SHALL check if the accept-type attribute(s) of the SDP m-line in the SIP INVITE request are acceptable to the IWF and, if not, reject the request with a SIP 488 "Not Acceptable Here" response. Otherwise, continue with the rest of the steps;
2. SHALL act as a user agent server according to rules and procedures of [RFC3261];
3. SHALL generate a SIP 200 "OK" response to the received initial SIP INVITE request according to rules and procedures of [RFC3261] with the following clarifications: the IWF:
   a. SHALL include a Server header to indicate the OMA CPM release version of the IWF as specified in Appendix C.
   b. SHALL include the SDP received in the SIP INVITE request as an answer SDP according to rules and procedures of [RFC3264], [RFC4566], [RFC4975], [RFC6135] and [RFC6714] with the following clarifications: the IWF:
      - SHALL include its own MSRP URI for the MSRP connection setup as a=path: MSRP URI;
      - SHALL set the SDP directional media attribute to a=recvonly;
      - SHALL set the a=setup attribute as “passive”.
4. SHALL send the SIP 200 "OK" response, without involvement of the SIP/IP core.

Upon receiving a SIP CANCEL request, the IWF:

1. SHALL act as UAS to handle the SIP CANCEL request according to the rules and procedures of [RFC3261].

Upon receiving a SIP ACK acknowledgement, the IWF:

1. SHALL act as “passive” endpoint according to [RFC6135] to establish the MSRP connection.

Upon receiving an MSRP SEND request, the IWF SHALL act as a gateway between the CPM service and the Non-CPM Communication Service with the following clarifications: the IWF:

1. SHALL wait until the whole Large Message Mode CPM Standalone Message is received (if the Large Message Mode CPM Standalone Message is sent chunked using multiple MSRP SEND requests);
2. SHALL handle the Large Message Mode CPM Standalone Message to communicate with the corresponding Non-CPM Communication Service. See sections 6.2, 6.3, and 6.4 for mapping towards SMS, MMS and e-mail.

Upon receiving a response from the Non-CPM Communication Service, the IWF SHALL handle the response according to the Non-CPM Communication Service. See sections 6.2, 6.3, and 6.4 for SMS, MMS, and e-mail.

The IWF MAY respond to the final MSRP SEND request with a 408 response prior to receiving a response from the Non-CPM System (e.g., per service provider policies).

Upon receiving a SIP BYE request, the IWF:

1. SHALL release all Media Plane resources corresponding to the MSRP session being closed;
2. SHALL generate a SIP 200 "OK" response and send it according to rules and procedures of [RFC3261].

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6.1.3 CPM File Transfer Handling

Upon receiving a SIP INVITE request with the CPM Feature Tag "3gpp-service.ims.icsi.oma.cpm.filetransfer", the IWF:

1. SHALL check if the offered SDP parameters are acceptable. If none of the offered SDP parameters is acceptable, the IWF SHALL reject the SIP INVITE request with a SIP 488 "Not Acceptable Here" response. Otherwise, continue with the rest of the steps;
2. SHALL act as a User Agent Server according to rules and procedures of [RFC3261];
3. SHALL store the Conversation-ID and Contribution ID headers received in the SIP INVITE request;
4. If the Non-CPM Communication Service to be interworked to does not support file transfer, the IWF SHALL proceed with step 5 or step 6 according to the service provider policy. Otherwise, the IWF SHALL convert the received SIP INVITE request to an appropriate file transfer invitation for the Non-CPM Communication Service according to the specification of the Non-CPM Communication Service;
5. When accepting the SIP INVITE request on behalf of the non-CPM user according to the service provider policy, the IWF SHALL generate a SIP 200 "OK" response according to rules and procedures of [RFC3261] with the following clarifications: the IWF:
   a. SHALL include a Server header to indicate the OMA CPM release version of the IWF as specified in Appendix C "*Release Version in User-Agent and Server Headers*";
   b. SHALL include the CPM Address of the IWF as the Authenticated Originator's CPM Address as specified in section 6.1 "*Authenticated Originator's CPM Address*" of [OMA-CPM-TS-Conv-Func]; and,
   c. SHALL include a MIME SDP body as an SDP answer according to rules and procedures of [RFC3264], [RFC4566] and to [RFC5547] with the following clarifications:
      - The IWF SHALL include its own MSRP URI for the MSRP connection setup as a=path: MSRP URI;
      - The IWF SHALL set the SDP directional media attribute to a=recvonly;
      - The IWF SHALL set the a=setup attribute as "passive".

NOTE: When this step 5 is executed, the IWF will accept and receive the file on behalf of non-CPM user and then forward the file to the non-CPM user using a normal message with the file as attachment.

6. When rejecting the SIP INVITE request for reasons unrelated to the requested media types, the IWF SHALL generate a SIP 480 "Temporarily Unavailable" response according to rules and procedures of [RFC3261];
7. SHALL send the generated SIP response towards the entity that sent the SIP INVITE request.

The IWF MAY respond to the SIP INVITE request with a SIP 408 "Request Timeout" response prior to receiving a response from the Non-CPM System (e.g., time-out reporting).

Upon receiving a SIP CANCEL request, the IWF:

1. SHALL act as UAS to handle the SIP CANCEL request according to the rules and procedures of [RFC3261].

Upon receiving a SIP ACK acknowledgement, the IWF SHALL set up an MSRP session according to the negotiated SDP parameters and SHALL act as a "passive" endpoint according to [RFC6135] to establish the MSRP connection.

Upon receiving an MSRP SEND request, the IWF SHALL act as a gateway between the CPM service and the Non-CPM Communication Service with the following clarifications: the IWF:

1. SHALL wait until the all files related to the CPM File Transfer are received (if the files are sent chunked using multiple MSRP SEND requests);
2. SHALL handle the CPM File Transfer to communicate with the corresponding Non-CPM Communication Service. See sections 6.3 and 6.4 for mapping towards MMS and e-mail.

Upon receiving a response from the Non-CPM Communication Service, the IWF SHALL handle the response according to the Non-CPM Communication Service. See sections 6.3 for MMS and 6.4 for e-mail.

Upon receiving a SIP BYE request for the CPM File Transfer session, the IWF:

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1. SHALL generate a SIP 200 "OK" response according to the rules and procedures of [RFC3261];
2. SHALL send the SIP 200 "OK" response;
3. If the Non-CPM Communication Service to be interworked to does support file transfer, the IWF SHALL convert the received SIP BYE request to an appropriate file transfer termination for the Non-CPM Communication Service file transfer according to the specification of the Non-CPM Communication Service;
4. SHALL send the output of step 3 to the corresponding Non-CPM Communication Service; and
5. SHALL release all Media Plane resources corresponding to the CPM File Transfer being terminated.

6.1.4 CPM Session Invitation Handling

Upon receiving a SIP INVITE request with the CPM Feature Tag corresponding to CPM Session, the IWF:

1. SHALL check if the offered SDP parameters are acceptable. If none of the offered SDP parameters is acceptable, the IWF SHALL reject the SIP INVITE request with a SIP 488 "Not Acceptable Here" response. Otherwise continue with the rest of the steps;
2. SHALL act as a User Agent Server according to rules and procedures of [RFC3261];
3. SHALL store the content of the Contact header in the SIP INVITE request;
4. SHALL store the Conversation ID and Contribution ID received in the SIP INVITE request;
5. If the Non-CPM Communication Service to be interworked to does not support sessions, the IWF SHALL proceed with step 6, step 7 or step 8 according to service provider policy. Otherwise, the IWF SHALL convert the received SIP INVITE request to an appropriate session invitation for the Non-CPM Communication Service session according to the specification of the Non-CPM Communication Service;
6. When accepting the SIP INVITE request on behalf of the non-CPM user according to service provider policy, the IWF SHALL generate a SIP 200 "OK" response according to rules and procedures of [RFC3261] with the following clarifications: the IWF:
   a. SHALL include a Server header to indicate the OMA CPM release version of the IWF as specified in Appendix C "*Release Version in User-Agent and Server Headers*";
   b. SHOULD include an Allow header with all supported SIP methods;
   c. SHALL include the CPM Address of the IWF as the Authenticated Originator's CPM Address as specified in section 6.1 "Authenticated Originator's CPM Address" of [OMA-CPM-TS-Conv-Func]; and,
   d. SHALL include a MIME SDP body as an SDP answer according to rules and procedures of [RFC3264], [RFC4145], [RFC4566] and in case of MSRP sessions, in addition according to [RFC4975], [RFC6135] and [RFC6714]. The IWF SHALL include in the SDP answer descriptions of all Media Streams specified in the received SIP INVITE request that it wishes to accept.
7. When rejecting the SIP INVITE request for reasons unrelated to the requested media types , the IWF SHALL generate a SIP 480 "Temporarily Unavailable" response according to rules and procedures of [RFC3261];
8. When asking the non-CPM user about whether or not to accept the CPM Session according to service provider policy, the IWF:
   a. SHALL convert the SIP INVITE request to a non-CPM message format based on the mapping tables as specified in sections 6.2, 6.3 and 6.4 for SMS, MMS and e-mail, respectively.
   b. SHALL send the converted non-CPM message according to rules and procedures of the corresponding Non-CPM Communication Service; and
   c. SHALL generate a SIP 200 "OK" response according to the procedures as specified in step 6 above when an accept response is received from the Non-CPM Communication Service. If the non-CPM user or non-CPM client declines the invitation, the IWF SHALL generate a SIP 480 "Temporarily Unavailable" or a SIP 603 "Decline" response according to rules and procedures of [RFC3261] and the circumstances to decline.
9. SHALL send the generated SIP response towards the entity that sent the SIP INVITE request.

The IWF MAY respond to the SIP INVITE request with a SIP 408 "Request Timeout" response prior to receiving a response from the Non-CPM System (e.g., time-out reporting).

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Upon receiving a SIP ACK acknowledgement from the originating CPM network, the IWF SHALL set up a SIP session according to the negotiated SDP parameters and with the following clarifications:

If establishing MSRP session(s) was negotiated, the IWF:

1. SHALL act as MSRP client according to [RFC4975] and [RFC6714];
2. SHALL act as an "active" or “passive” endpoint as negotiated, according to [RFC4975] and [RFC6135]; and
3. SHALL establish the MSRP connection according to the [RFC6714];
4. SHALL send an empty MSRP SEND request to bind connection to MSRP session from the perspective of the passive endpoint according to rules and procedures of [RFC4975].

NOTE: Interworking to Non-CPM Communication Services supporting continuous Media beyond what is covered in MSRP is not standardized in CPM 1.0 but, due to the framework and open nature of CPM, can be supported in deployment specific ways.

6.1.5 CPM Session Modification Handling

Upon receiving a SIP re-INVITE request with the CPM Feature Tag “3gpp-service.ims.icsi.oma.cpm.session”, the IWF:

1. SHALL identify which SDP parameters in the received SDP offer have been changed compared to the last one received before;
2. SHALL check if the changed SDP parameters are acceptable. If none of the changed SDP parameters is acceptable, the IWF SHALL reject the SIP re-INVITE request with a SIP 488 "Not Acceptable Here" response. Otherwise, continue with the rest of the steps;
3. SHALL act as a user agent server according to rules and procedures of [RFC3261];
4. If the Non-CPM Communication Service to be interworked to does not support sessions, the IWF SHALL proceed with step 5, step 6 or step 7 according to service provider policy. Otherwise, the IWF SHALL convert the received SIP INVITE request to an appropriate session invitation for the Non-CPM Communication Service session according to the specification of the Non-CPM Communication Service;

NOTE 1: Signalling mapping between CPM service and Non-CPM Communication Services other than SMS, MMS or e-mail is out of scope of CPM 1.0.

5. When accepting the SIP re-INVITE request on behalf of the non-CPM user according to service provider policy, the IWF:
   a. SHALL generate a SIP 200 "OK" response according to rules and procedures of [RFC3261];
   b. SHALL include a Server header to indicate the OMA CPM release version of the IWF as specified in Appendix C “*Release Version in User-Agent and Server Headers*”; and,
   c. SHALL include a MIME SDP body as an SDP answer according to the rules and procedures of [RFC3264], [RFC4145], [RFC4566] and in the case of MSRP sessions, according to [RFC4975]. The IWF SHALL include in the SDP answer descriptions of all Media Streams specified in the received SIP INVITE request that it wishes to accept.
6. When asking the non-CPM user about whether or not to accept the CPM Session according to service provider policy, the IWF:
   a. SHALL convert the SIP re-INVITE request to a non-CPM message format based on the mapping tables as specified in sections 6.2, 6.3, and 6.4 for SMS, MMS, and e-mail, respectively.
   b. SHALL send the converted non-CPM message according to the rules and procedures of the corresponding Non-CPM Communication Service; and
   c. SHALL generate a SIP 200 "OK" response after an accept response is received from the Non-CPM Communication Service. If the non-CPM user or non-CPM client declines the CPM Session modification, the IWF SHALL generate a SIP 480 "Temporarily Unavailable" or a SIP 603 "Decline" response according to the rules and procedures of [RFC3261] and the circumstances to decline.
7. SHALL send the generated SIP response, without involvement of the SIP/IP core.

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For steps 5-7, the IWF MAY respond to the SIP INVITE request with a SIP 408 “Request Timeout” response prior to receiving a response from the Non-CPM System (e.g., time-out reporting).

Upon receiving a SIP ACK acknowledgement from the originating CPM network, the IWF SHALL change the CPM Session according to the re-negotiated SDP parameters and [RFC3261].

6.1.5.1 CPM Session Media Handling

This subsection specifies the IWF process about handling of received Media after a CPM Session is established.

Upon receiving Media via a CPM Session the IWF:

1. SHALL create the non-CPM message from the received Media as specified in section 6.2, 6.3, or 6.4 if the Non-CPM Communication Service is SMS, MMS or e-mail service, respectively. Otherwise, it MAY perform the protocol conversion according to the specification of the Non-CPM Communication Service and service provider mapping rules;
2. SHALL send the output of step 1 to the corresponding Non-CPM Communication Service.

Upon receiving Media from the Non-CPM Communication Service, the IWF:

1. SHALL create one or more MSRP SEND requests (more than one if chunking is needed to transfer the CPM Standalone Message) from the received non-CPM message as specified in section 6.2, 6.3, or 6.4 if the Media is received in SMS, MMS or e-mail format, respectively. Otherwise, it SHALL perform, if needed, the protocol conversion according to service provider mapping rules between CPM and the Non-CPM Communication Service;

   The Interworking Function MAY respond to the Non-CPM System prior to receiving a response to the MSRP SEND, depending on service provider policies.
2. SHALL send the output of step 1 according to the Media path established in the CPM domain.

6.1.6 CPM Session Leaving

6.1.6.1 CPM Initiated

Upon receiving a SIP BYE request with the CPM Feature Tag “3gpp-service.ims.icsi.oma.cpm.session”, the IWF:

1. SHALL generate a SIP 200 "OK" response according to the rules and procedures of [RFC3261];
2. SHALL send the SIP 200 "OK" response;
3. SHALL generate a non-CPM message for session leaving according to the mapping rules as specified in section 6.2, 6.3, or 6.4 if the Non-CPM Communication Service is SMS, MMS or e-mail service, respectively. Otherwise, the IWF SHALL generate a session leaving request appropriate for the Non-CPM Communication Service;
4. SHALL send the output of step 3 to the corresponding Non-CPM Communication Service; and
5. SHALL release all Media Plane resources corresponding to the CPM Session being closed.

6.1.6.2 Non-CPM Initiated

Upon receiving a request to leave a session from the Non-CPM Communication Services SMS or MMS, the IWF:

1. SHALL map the session leaving message into a SIP BYE request to leave the CPM Group Session or to close the CPM 1-1 Session, according to the procedures of 6.2.2.2.4 and 6.3.1.1.6.5 for SMS and MMS respectively;
2. SHALL send the SIP BYE request to the CPM Client;
3. SHALL release all Media Plane resources corresponding to the CPM Session being closed.

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6.1.7 Participant Information Handling

When a CPM Group Session has been established with at least one participant being served by a Non-CPM Communication Service, the IWF subscribes to the Participant Information according to service provider policy and follows the procedures as defined in section 7.3.10.1 "*Subscribe to Receiving a Participant Information*" of [OMA-CPM-TS-Conv-Func] with the following clarifications: the IWF

1. SHALL include the CPM Address of the IWF as the Authenticated Originator's CPM Address as specified in section 6.1 "*Authenticated Originator's CPM Address*" of [OMA-CPM-TS-Conv-Func]
2. The IWF SHALL include a User-Agent header to indicate the OMA CPM release version of the IWF as specified in Appendix C "*Release Version in User-Agent and Server Headers*"

Upon receiving an incoming SIP NOTIFY request that is part of the same SIP dialog as the previously sent SIP SUBSCRIBE request for subscribing to participation information, the IWF:

1. SHALL handle the request according to the rules and procedures of [RFC3265] and [RFC4575].
2. SHALL check if the Content-Type is acceptable to the IWF. If not, reject the request with a 415 "Unsupported Media Type" response as defined in [RFC3265].
3. SHALL convert the received SIP NOTIFY request into the appropriate non-CPM message based on the conversion rules as defined for each Non-CPM Communication Service. See sections 6.2, 6.3, and 6.4 for mapping towards SMS, MMS and e-mail respectively.
4. SHALL send the non-CPM message towards the corresponding Non-CPM Communication Service.

Upon receiving the response from the Non-CPM Communication Service, the IWF SHALL handle the response according to the Non-CPM Communication Service. See sections 6.2, 6.3, and 6.4 for SMS, MMS and e-mail respectively.

6.2 Interworking with SMS

Interworking between CPM and SMS consists of translating CPM Standalone Messages, CPM Session Invitations or CPM Chat Messages to SMS messages as well as translating SMS messages to Pager Mode CPM Standalone Messages, Large Message Mode CPM Standalone Messages or CPM Chat Messages.

Two interworking realizations are described in this version of the specification:

- An IP Short Message Gateway (IP-SM-GW) realization, and
- An External Short Message Entity (ESME) realization.

They are functionally equivalent, and are described below.

When interworking messages between CPM and SMS, with respect to handling SMIL content:

- Upon interworking from CPM to SMS, the IWF receiving a CPM Standalone Message that uses SMIL (for media synchronization and scene description) SHALL, before delivering the content to SMS remove all content non compatible with SMS (e.g., clips, SMIL).
- Upon interworking from SMS to CPM, the IWF receiving an SMS SHALL provide it to CPM without adding any SMIL.

6.2.1 IP Short Message Gateway (IP-SM-GW) Realization

The following documents describe the interworking between CPM and SMS using the IP-SM-GW realization:

- [3GPP TS23.204], which provides information on the flows for message delivery, delivery notifications and read reports, and session interworking. As an addition, in the CPM to SMS cases when the CPM Participating Function holds the deferred delivery functions for all access domains, the CPM Interworking Function SHALL inform the CPM Participating Function about failed SMS deliveries and then obtain information about that recipient CPM User's availability for SMS delivery (e.g. registration in CS domain). In that case, the CPM Interworking Function

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SHALL also notify the CPM Participating Function when the CPM User is available again in CS domain for a SMS delivery;

- [3GPP TS29.311], which provides detailed message and parameter mapping for service level SMS interworking for:

  i. CPM Session interworking to and from SMS, and

  ii. SIMPLE IM Standalone Message Pager Mode with SMS. The detailed SIP message and parameter mapping defined for SIMPLE IM Pager Mode interworking with SMS applies for the interworking with CPM Pager Mode Standalone Message, with the additional clarifications and differences defined in this specification.

     - The appropriate CPM CPM Feature Tag is used instead of the SIMPLE IM feature tags;
     - The body of the SIP MESSAGE SHALL contain the contents of the short message(s) wrapped in a CPIM (Common Presence and Instant Messaging) wrapper as defined in section 7.2.1.3 of [OMA-CPM-TS-Conv-Func];
     - Standalone Large Message Mode interworking to SMS is out of scope of [3GPP TS29.311], but Standalone Large Message Mode is used to interwork concatenated SMS messages when they exceed the size of the Standalone Pager Mode message. The detailed parameter mapping of SMS into a SIMPLE IM Standalone Large Message Mode applies the same to the interworking to CPM Standalone Large Message Mode, with clarifications and differences defined in this specification.

In addition to section 6.1 "*General Principles*", the following clarifications and differences with [3GPP TS29.311] apply for CPM interworking with SMS:

a) The Conversation-ID and Contribution-ID header fields as defined in Appendix C of [OMA-CPM-TS-Conv-Func] SHALL be populated by CPM Interworking Function in all SMS to CPM interworking scenarios (CPM Standalone Messages and CPM Session);

b) As CPM Participating Function provides deferred delivery, the CPM Client capability to receive CPM Messages does not depend on its registration status. The CPM Interworking Function using an IP-SM-GW SHALL NOT use the registration as indication for CPM Client capability to receive CPM Messages. Hence all SMS messages sent to a CPM User and received by the CPM Interworking Function SHALL be interworked and the delivery result and associated delivery data (if applicable) SHALL be sent further to the CPM Participating Function.

c) For interworking SMS to CPM Large Message Mode and CPM Session:

   1) Message-Expires header field SHALL NOT be included;

   2) A Supported header field with a value of 'timer' and a Session-Expires header with a refresher parameter set to 'uac' SHALL be included;

   3) the SDP (Session Description Protocol) body SHALL be composed as defined in:

      - section 7.2.1.2 of [OMA-CPM-TS-Conv-Func] for delivery via CPM Standalone Large Message Mode message;
      - section 5.2.1.1 of [OMA-CPM-TS-Conv-Func] for delivery via CPM Session;

   4) The MSRP To-path, From-path header fields SHALL be set as described in [OMA-CPM-TS-Conv-Func] following [RFC6714], instead of the procedures from [3GPP TS29.311] using [MSRP-SESSMATCH];

   5) The Success-Report and Failure-Report header fields in MSRP SEND SHALL be set based on the service provider's policy for the specific CPM feature (e.g. CPM Session and CPM Standalone Large Message Mode);

   6) When a 2xx response to a CPM Standalone Large Message is received, the behaviour as described in 6.1.4.3.2 of [3GPP 29.311] is not applicable for CPM, the procedure for handling the SIP

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session and the MSRP requests defined in section 7.2.1.2 of [OMA-CPM-TS-Conv-Func] SHALL be used instead; When a response different from 2xx is received to a CPM Standalone Large Message, a SIP ACK request SHALL be sent in order to acknowledge its reception and a delivery report (including appropriate User error parameter) SHALL be sent, as described in sect. 6.1.4.4 of [3GPP 29.311];

7) When a SIP BYE request is received during the transmission of a CPM Message, the transmission will be stopped, a 200 OK response will be returned to the SIP BYE request and the Media Plane resources SHALL be released. A delivery report (including appropriate User error parameter) SHALL be sent, as described in sect. 6.4.1.4 of [3GPP 29.311];

8) When an error occurs during the MSRP transmission (loss of the TCP connection, or a non-2xx response is received for a MSRP SEND request), the MSRP transmission SHALL be stopped, a SIP BYE request SHALL be sent and when a response is received for the SIP BYE request, the Media Plane resources will be released. A delivery report (including appropriate User error parameter) SHALL be sent, as described in sect. 6.1.4.4 of [3GPP 29.311].

9) When a response is received on SIP BYE request, the Media Plane resources SHALL be released and a status report SHALL be sent.

Note 1: SMS messages containing user messages SHALL be delivered via service level interworking as CPM Messages (Standalone Messages, CPM Session), as described in this specification.

Note 2: [3GPP TS29.311] defines the following SMS delivery methods for service level interworking to SMS listed below. Their applicability is subject to service provider policies, device and access type (e.g. tablet on broadband), type of SMS message (user message, system message/binary SMS):

- SMS delivered over CS, or
- SMS delivered over PS, or
- SMS over IP (transport level interworking).

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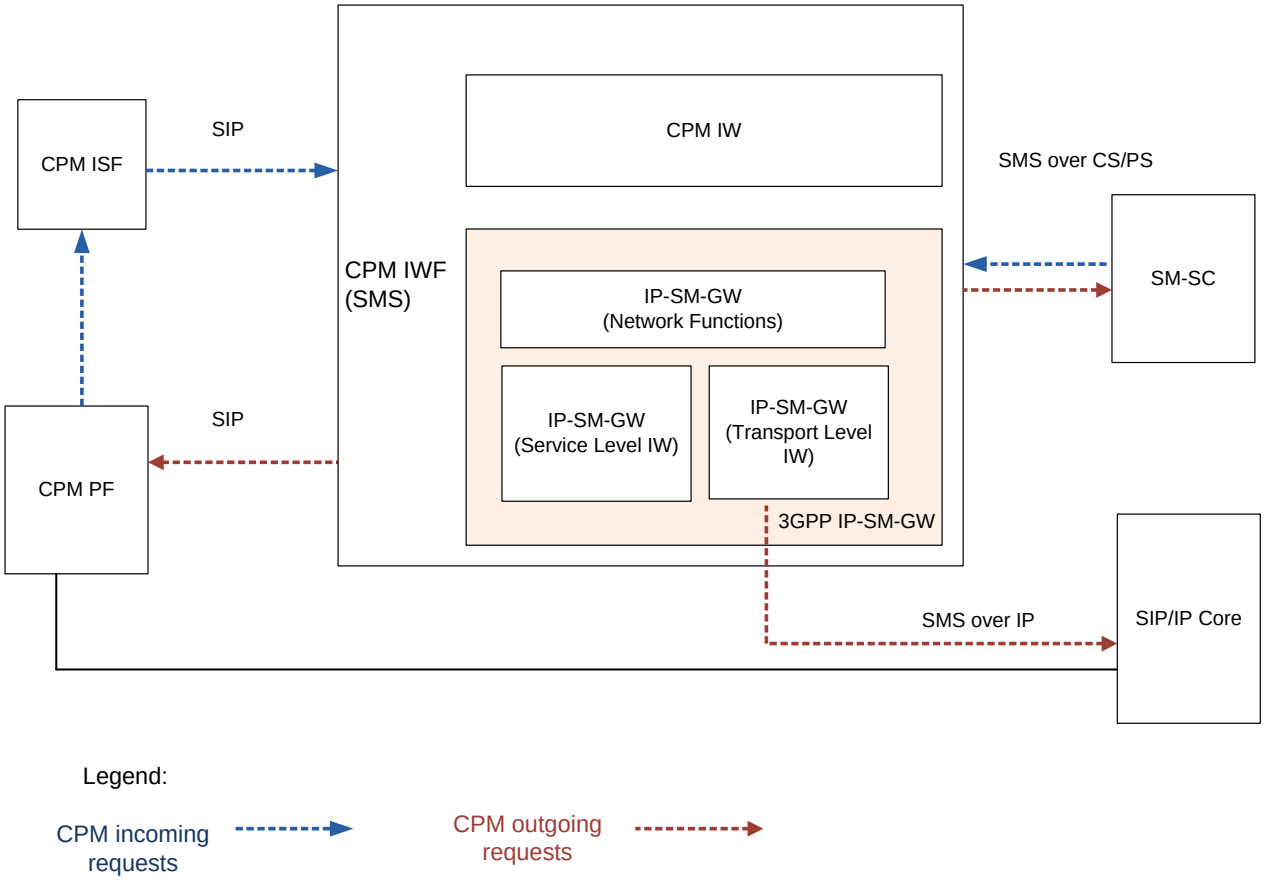

6.2.2 External Short Message Entity Realization

The SMS IWF acts as an ESME interfacing the SM-SC as defined in [SMPP]. Figure 1 shows the architecture of interworking between CPM and SM-SC.

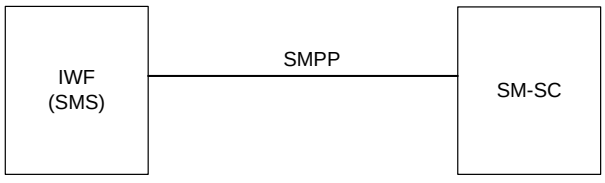

Figure 1 CPM - SMS interworking architecture

NOTE 1: Typically, the SM-SC is located in the same network as the SMS IWF

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The SMS IWF SHALL be able to translate CPM Standalone Messages to SMPP messages and SMPP messages to CPM Standalone Messages as described in the following sub-sections. The tables in the following sub-sections contain a description of the parameters that are necessary for CPM to/from SMS interworking.

The SMPP messages being used are as follows:

- submit_sm,
- submit_sm_resp,
- deliver_sm,
- deliver_sm_resp.

When the CPM Participating Function supports the deferred delivery over all access domains, then the CPM InterworkingFunction SHALL use only transactional SMPP messages data_sm and data_sm_resp. This allows exercising aggregated deferral functions in the CPM Participating Function.

NOTE 2: The SMS IWF has to perform an SMPP bind operation before being able to send or receive these SMPP messages.

NOTE 3: when data_sm and data_sm_resp messages are used as alternatives for submit_sm and submit_sm_resp as described in [SMPP], the same translation tables as described below for submit_sm and submit_sm_resp will be used for data_sm and data_sm_resp in that case.

NOTE 4: SMPP operations for which there is no translation issue will not be considered in this document.

NOTE 5: When sending SMS messages to the SM-SC, the SMS IWF may leave generation of concatenated messages to the SM-SC. However this is not in scope of this document as it is not a typical case.

6.2.2.1 Interworking from CPM to SMS

The handling of the SMS IWF for interworking CPM requests to SMS message is as follows:

- When the SMS IWF receives a Pager Mode CPM Standalone Message (e.g., SIP MESSAGE request containing the '3gpp-service.ims.icsi.oma.cpm.msg' feature tag), it SHALL handle the Pager Mode CPM Standalone Message as described in section 6.2.2.1.1 "*Pager Mode CPM Standalone Message to SMS Message*". When the payload of the received CPM Standalone Message cannot be delivered by one short message due to the size limit, then the SMS IWF SHALL translate the received CPM Standalone Message into concatenated short messages.
- When the SMS IWF receives a CPM Session Invitation for the exchange of CPM Chat Messages (i.e., a SIP INVITE request containing the '3gpp-service.ims.icsi.oma.cpm.session' feature tag), it SHALL handle the CPM Session Invitation as described in section 6.2.2.1.3 "*CPM Session Invitation to SMS Message*".
- When the SMS IWF receives a CPM CPM Chat Message within an existing CPM Session, it SHALL handle the CPM Chat Message as described in section 6.2.2.1.5 "*CPM Chat Message to SMS Message*".
- When the SMS IWF receives from the SM-SC an SMS status report that is associated with a previously interworked CPM Standalone Message, it SHALL handle the SMS status report as described in section 6.2.2.1.2 "*SMS Status Report to CPM Delivery Notification*".
- When the SMS IWF receives a CPM Session Leaving request, it SHALL handle the CPM Session Leaving as described in section 6.2.2.1.4 *"CPM Session Leaving Request to SMS Message"*.
- When the SMS IWF receives a Participant Information notification, it SHALL handle the Participant Information notification as described in section 6.2.2.1.6 "*Participant Information to SMS Message Procedures and Parameters mapping"*.

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6.2.2.1.1 Pager Mode CPM Standalone Message to SMS Message

When the SMS IWF receives a SIP MESSAGE request with the CPM Feature Tag “3gpp-service.ims.icsi.oma.cpm.msg”, it SHALL check the size of the received payload of the SIP MESSAGE request. If the size of the payload is too large to be sent as one submit_sm, the payload SHALL be divided into concatenated submit_sm(s). Otherwise, the SMS IWF SHALL generate a submit_sm request based on the received SIP MESSAGE request and in accordance with [SMPP], with the clarifications given in Table 1 below and send the submit_sm request towards the SM-SC.

When the SMS IWF receives a submit_sm-resp it SHALL store the message_id parameter in order to find the corresponding SMS transaction upon receiving deliver_sm containing the status report information from the SM-SC later, SHALL generate a SIP response based on the received submit_sm_resp and in accordance with [SMPP], with the clarification given in Table 2 below and send the SIP response towards the ISF. If the SMS messages sent to the SM-SC were concatenated messages, the SMS IWF SHALL wait until all the submit_sm_resp for each Submit_sm request have been received. In this case, the SIP response SHALL be sent when the SMS IWF receives the last submit_sm-resp.

If the CPM Client has requested a CPM delivery notification and a SMS status report is received from the SM-SC as a result of the delivery, the SMS IWF SHALL handle the received SMS status report as described in 6.2.2.1.2.

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submit_sm parameters	**SMPP parameters** **status**	**CPM SIP MESSAGE headers [headers from [RFC3428] unless otherwise noted]**	**Comment**
service_type	Mandatory		Set by the IWF to NULL.
source_addr_ton, source_addr_npi, source_addr	Mandatory	P-Asserted-Identity [RFC3325], if present, otherwise From	Translated by the IWF to the corresponding routable originating user's address.
dest_addr_ton, dest_addr_npi, destination_addr	Mandatory	Request-URI or To	Translated by the IWF to the corresponding routable target user's address.
esm_class	Mandatory		Set by the IWF to "Store and Forward" as defined in [SMPP].
protocol_id	Mandatory		Set by the IWF to the appropriate value defined in [SMPP] based on the network type (e.g., GSM, CDMA).
priority_flag	Mandatory	Priority	Set to the corresponding value from the CPM Standalone Message, for example, non-urgent = non-priority, normal = Level1 priority, urgent = Level2 priority, emergency = Level3 (highest) priority in the case of GSM. NOTE: As different technologies use different priority values, how to map the level of priority accordingly between CPM side and SM-SC side is network-dependent.
schedule_delivery_time	Mandatory		Set to NULL for immediate delivery.
validity_period	Mandatory	Expires	Set based on the value of the Expires header if present; otherwise, set as per service provider policy.

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registered_delivery	Mandatory	imdn.Disposition-Notification [RFC5438]	Set to the corresponding value based on [SMPP] when imdn.Disposition-Notification is set to positive-delivery, negative-delivery, interworking or any combination of them with the following clarification: positive-delivery = xxxxxx01 negative-delivery = xxxxxx10 interworking = xxxxxx01 Any combinations of positive-delivery with negative-delivery and/or with interworking = xxxxxx01. If none was requested, set to NULL. NOTE: In SMS, "xxxxxx01" corresponds to both positive and negative delivery, while "xxxxxx10" corresponds to negative delivery only.
replace_if_present_flag	Mandatory		Set to NULL.
data_coding	Mandatory	Content-Type	Set by the IWF along with character set parameter of Content-Type based on [SMPP] and service provider policy. If there is no character set parameter or corresponding value, set to NULL.
sm_default_msg_id	Mandatory		Set by the IWF to NULL.
sm_length	Mandatory	Content-Length	Set by the IWF to be the length of the payload of the resulting short message.
short_message	Mandatory	body	NOTE: The payload needs to be encoded using the encoding scheme indicated by data_coding. NOTE: The mapping is restricted to only the text.
language_indicator	Optional	Content-Language	Set by the IWF, if any, to the corresponding value based on the [SMPP] and service provider policy. Otherwise, set to NULL.
sar_msg_ref_num	Optional		Set by the IWF to the newly generated reference number to the concatenated SMs based on [SMPP].
sar_segment_seqnum	Optional		Set by the IWF to the ordering number of each concatenated SM based on [SMPP].
sar_total_segments	Optional		Set by the IWF to the total number of concatenated SMs based on [SMPP].

Table 1: Pager Mode CPM Standalone Message to SMS - submit_sm request details

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CPM SIP MESSAGE headers [headers from [RFC3428] unless otherwise noted]	CPM Headers status	Comment
response code and reason phrase based on [RFC3261]	Mandatory	Set the response code and reason phrase according to the command_status header in the submit_sm-resp, e.g., – 202 "Accepted" sent when command_status is 0 – 400 "Bad Request" sent when command_status is 3 – 404 "Not Found" sent when command_status is B – 503 "Service Unavailable" sent when command_status is 58 – 480 “Temporarily Unavailable” sent when received in data_sm_resp, and command status is ESME_RDELIVERYFAILURE 0x000000FE Delivery Failure. NOTE: Use of reserved values in SMPP error codes is out of scope.
Call-ID	Mandatory	Set to the Call-ID header field received in the SIP MESSAGE request.
To	Mandatory	Set to the To header field received in the SIP MESSAGE request.
Via	Mandatory	Set to the Via header field received in the SIP MESSAGE request.
From	Mandatory	Set to the From header field received in the SIP MESSAGE request.
Cseq	Mandatory	Set to CSeq header field received in the SIP MESSAGE request.
Content-Length	Mandatory	Set to 0.

Table 2: Pager Mode CPM Standalone Message to SMS - SIP response details

6.2.2.1.2 SMS Status Report to CPM Delivery Notification

When the IWF receives a deliver_sm request with a status report from SM-SC, it SHALL perform the following:

1. Check if there is the same stored message_id received in submit_sm-resp as the receipted_message_id parameter received in deliver_sm with the following clarification:
    a. If there is no matching message_id, then respond with an error towards the SM-SC setting Command Status header to ESME_RINVMSGID based on [SMPP];
    b. Otherwise, continue with the rest of the steps;
2. Generate a SIP MESSAGE request with a delivery notification in accordance with [RFC5438], with the clarifications given in Table 3: CPM to SMS message - CPM Delivery Notification details below, using a CPIM body per [RFC3862] that carries a Disposition Notification XML document. The MIME type of the Disposition Notification XML document is "message/imdn+xml";
3. Send the SIP MESSAGE request towards the CPM Client in accordance with the rules and procedures of the SIP/IP core;
4. Respond with a deliver_sm_resp towards the SM-SC following the rules and procedures in [SMPP].

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CPM Delivery Notification header [headers from CPM, [RFC3261], [RFC3862], and [RFC5438] unless otherwise noted]	CPM Presence	deliver_sm [status report]	Comment
SIP header: Asserted-Identity and/or From CPIM header: From	Mandatory	source_addr_ton, source_addr_npi, source_addr	Translated by the IWF to the corresponding routable originating user's address. NOTE: the SIP headers P-Asserted-Identity, From and CPIM header From are identical to the received SIP header To and the CPIM header To in the corresponding Pager Mode CPM Standalone Message.
SIP header: Request-URI, SIP header: To CPIM header: To	Mandatory	dest_addr_ton, dest_addr_npi, destination_addr	Translated by the IWF to the corresponding routable target CPM User's address. NOTE: the SIP headers Request-URI and To and the CPIM header To are identical to the received SIP header From and the CPIM header From in the corresponding Pager Mode CPM Standalone Message.
CPIM header: imdn.Message-ID	Mandatory		Set to a message id newly generated by the IWF based on [RFC5438].
CPIM header: Content-Disposition : notification XML body: <delivery-notification> <status> and/or <interworking-notification> <status>	Mandatory	message_state	Set the <delivery-notification> <status> to the corresponding value of message_state (e.g., DELIVERED=delivered, REJECTED=forbidden, UNKNOWN=error, etc) based on service provider policy. Set the <interworking- notification>, sub-element <status> to the corresponding value of message_state (e.g., DELIVERED=legacy-sms, REJECTED=error, UNKNOWN=error, etc) based on service provider policy. NOTE: IMDN notifications are populated depending on which IMDN notification types have been requested, or based on service provider policy.
XML body: <datetime>	Mandatory		Set by the IWF to the received CPIM DateTime header of the corresponding Pager Mode CPM Standalone Message, or if not present, set by the IWF to the date and time the corresponding Pager Mode CPM Standalone Message was received by the IWF.
XML body: <message-id>	Mandatory		Set to the received imdn.Message-ID in the corresponding Pager Mode CPM Standalone Message based on [RFC5438].
CPIM header: IMDN-Route	Conditional		Set to IMDN-Record-Route header, if present and received in the corresponding Pager Mode CPM

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			Standalone Message.
XML body: <original-recipient-uri>	Conditional		Set to Original-To header, if present, received in the corresponding Pager Mode CPM Standalone Message.
XML body: <recipient-uri>	Optional		Set by the IWF according to [RFC5438] (i.e., set to CPIM To header received in the corresponding Pager Mode CPM Standalone Message).
SIP header: Call-ID	Mandatory		Set by the IWF according to [RFC3261].
SIP header: CSeq	Mandatory		Set by the IWF according to [RFC3261].
SIP header: Content-Type	Mandatory		Set SIP Content-Type header to message/cpim according to [RFC5438].

Table 3: CPM to SMS message - CPM Delivery Notification details

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6.2.2.1.3 CPM Session Invitation to SMS Message

When the SMS IWF receives a SIP INVITE request and if it is supposed to accept the session invitation on behalf of the SMS user based on the service provider policy, the SMS IWF SHALL complete the SIP signaling on behalf of the SMS Client as described in section 6.1.4 "*CPM Session Invitation Handling*".

When the SMS IWF receives a SIP INVITE request and if it is supposed to ask for the recipient's response based on service provider policy, the SMS IWF:

1. For a CPM 1-1 Session, the SMS IWF SHALL either assign a new address to be used as the sender for all messages sent in relation to this session or use the TEL URI of the inviting CPM User as the address of the sender for this session. If a new address has been assigned, the identity of the inviting CPM User SHALL be included in the body of the SMS message.
2. For a CPM Group Session invitation, a new address SHALL be assigned to represent the group for the SMS user, and SHALL be used as the sender for all messages sent in relation to this session. In this case, the SMS user SHALL also receive the identity of the inviting CPM User as well as information about the group in the body of the SMS message.
3. SHALL generate a submit_sm request based on the received SIP INVITE request and in accordance with [SMPP], with the clarifications given in Table 4 below,
4. SHALL send the submit_sm request towards the SM-SC.

Upon receiving the submit_sm-resp, if the submit_sm-resp contains an error response, then the SMS IWF SHALL generate a SIP response based on the received submit_sm-resp and [RFC3261], with the clarifications given in Table 2 in section 6.2.2.1.1 "*Pager Mode CPM Standalone Message to SMS Message*" and subsequently send the SIP response towards the ISF. Otherwise, the SMS IWF waits for the recipient's response.

When the SMS IWF receives a deliver_sm request, it performs the following:

1. SHALL check if the deliver_sm message contains a user response based on [SMPP]. If the received deliver_sm does not contain a user response, the SMS IWF handles the message as a Pager Mode CPM Standalone Message or a SMS status report based on the value of the received parameters. Otherwise, continue with the rest of the steps.

NOTE: As for GSM, the deliver_sm contains the text indicating the response of the recipient. The SMS IWF has to interpret the received text accordingly based on the service provider policy.

2. SHALL generate a SIP response based on the received deliver_sm request and according to [RFC3261], and according to the received user response code as defined in Table 5 below.
3. SHALL send the SIP response towards the ISF.
4. SHALL send a deliver_sm_resp towards the SM-SC following the rules and procedures in [SMPP].

After the MSRP session has been established, payload from the CPM Client is delivered using MSRP SEND request(s) to the SMS IWF and it is handled as described in 6.2.2.1.5 "*CPM Chat Message to SMS Message*". SMS message(s) received from the SM-SC are handled as described in 6.2.2.2.2 "*SMS Message to CPM Chat Message*".

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submit_sm parameters	SMPP parameters status	SIP INVITE [headers from RFC3261 unless otherwise noted]	Comment
service_type	Mandatory		Set to NULL
source_addr_ton, source_addr_npi, source_addr	Mandatory	P-Asserted-Identity [RFC3325], if present, otherwise From	Translated to the corresponding routable originating user's address.
dest_addr_ton, dest_addr_npi, destination_addr	Mandatory	Request-URI or To	Translated to the corresponding routable target user's address.
esm_class	Mandatory		Set to "Store and Forward" as defined in [SMPP].
protocol_id	Mandatory		Set to the appropriate value defined in [SMPP] based on the network type (e.g., GSM, CDMA).
priority_flag	Mandatory	Priority	If there is no Priority header received, set to 'Urgent' according to [SMPP]. Otherwise, set to the corresponding value of SIP INVITE. NOTE: As different technologies use different priority values, how to map the level of priority between CPM side and SM-SC side is network-dependent.
schedule_delivery_time	Mandatory		Set to NULL for immediate delivery.
validity_period	Mandatory	Expires	Set to the corresponding value of Expires header, if present. Otherwise set based on the service provider's policy.
registered_delivery	Mandatory		Set as follows: – CDMA: 0x80 (SME Manual/User Acknowledgement requested) – GSM: Null According to the network type following the rules in [SMPP]. NOTE: The specific code above is for requesting user acknowledgement about whether to accept the session invitation or not.
replace_if_present_flag	Mandatory		Set to NULL.
data_coding	Mandatory		Set based on service provider policy.

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sm_default_msg_id	Mandatory		Set based on the service provider policy. Otherwise, set to Null. NOTE: This can only be used when the SM-SC has a pre-defined SM text set for prompting the user to select the options (e.g., 'accept', 'reject'). How to organize the prompting text on the device is implementation specific.
sm_length	Mandatory		Set to the length of the user data.
short_message	Mandatory		Set to the appropriate value depending on the network type and service provider policy (e.g., CDMA/TDMA: None, GSM: pre-defined text). NOTE: For GSM, the pre-defined text is for prompting the user to select 'accept' or 'reject' The exact definition of the pre-defined text is out-of-scope in this document. But at least it needs to carry a keyword for each session 'accept' and 'reject'.

Table 4: CPM Session Initiation to SMS - submit_sm request details

Response to SIP INVITE	**CPM headers status**	**deliver_sm parameters**	**Comment**
Response code and phrase	Mandatory	user_response_code (for CDMA/TDMA) or short_message (for GSM)	Set to 200 "OK" if the recipient accepts the invitation. Otherwise, set to 603 "Decline". NOTE: Actual user_response_code or appropriate SM text from the recipient is based on the service provider policy. NOTE: For GSM, the keyword for session 'accept' or 'reject' in the replying text from the recipient is mapped into the appropriate response code by the IWF. The exact definition of the replying text is out-of-scope in this document. But at least it needs to carry a keyword for either session 'accept' or 'reject'.
Call-ID	Mandatory		Set to the received Call-ID in the SIP INVITE request.
To	Mandatory		Set to the received To in the SIP INVITE request.
Via	Mandatory		Set to the received Via in the SIP INVITE request.
From	Mandatory		Set to the received From in the SIP INVITE request.
CSeq	Mandatory		Set to the received CSeq in the SIP INVITE request.
Content-Length	Mandatory		Set to the length of the SDP body.
body	Conditional		If the Response code is 2xx, body is set as an SDP answer according to [RFC3264], [RFC4566] and [RFC4975]. Otherwise, there will not be an SDP body.

Table 5: CPM Session Initiation to SMS – SIP response details

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Upon receiving SIP BYE request, the SMS IWF MAY send a submit_sm request towards the SMS user as described in section 6.2.2.1.4 "*CPM Session Leaving Request to SMS Message*".

6.2.2.1.4 CPM Session Leaving Request to SMS Message

When the SMS IWF receives a SIP BYE request and if there is a corresponding CPM Session, the SMS IWF performs as defined in 6.1.6 "*CPM Session Leaving*" with the following clarification:

1. SHALL generate a submit_sm request based on the received SIP BYE request and in accordance with [SMPP], with the clarifications given in Table 6 below and service provider policy. The generated submit_sm request SHALL contain an appropriate SM text notifying the SMS user of the leaving of the CPM Group Session or the closing of the CPM 1-1 Session.
2. SHALL send the submit_sm message towards the SM-SC.

submit_sm parameters	**SMPP parameters status**	**SIP BYE [headers from RFC3261 unless otherwise noted]**	**Comment**
service_type	Mandatory		Set to NULL.
source_addr_ton, source_addr_npi, source_addr	Mandatory		Translated to the corresponding routable address as per section 6.2.2.1.3.
dest_addr_ton, dest_addr_npi, destination_addr	Mandatory	Request-URI or To	Translated to the corresponding routable target user's address.
esm_class	Mandatory		Set to "Store and Forward" as defined in [SMPP].
protocol_id	Mandatory		Set to the appropriate value defined in [SMPP] based on the network type (e.g., GSM, CDMA).
priority_flag	Mandatory	Priority	If there is no Priority header received, set to "Urgent" according to [SMPP]. Otherwise, set to the corresponding value of SIP INVITE request. NOTE: As different technologies use different priority values, how to map the level of priority between CPM side and SM-SC side is network-dependent.
schedule_delivery_time	Mandatory		Set to NULL for immediate delivery.
validity_period	Mandatory		Set to NULL.
registered_delivery	Mandatory		Set to NULL.
replace_if_present_flag	Mandatory		Set to NULL.
data_coding	Mandatory		Set based on service provider policy.
sm_default_msg_id	Mandatory		Set based on the service provider policy. Otherwise, set to Null. NOTE: This can only be used when the SM-SC has a pre-defined SM text set for informing the user about closure of the CPM Session.

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sm_length	Mandatory		Set to the length of the user data.
short_message	Mandatory		Set to the appropriate value depending on the service provider policy (e.g., pre-defined text). NOTE: The pre-defined text is for informing the user of leaving the CPM Group Session or the closing of the CPM 1-1 Session.

Table 6: CPM Session Leaving to SMS - submit_sm request details

6.2.2.1.5 CPM Chat Message to SMS Message

NOTE 1: This section assumes that a CPM Session for CPM Chat Message delivery has been established, with an SMS user participating.

When the SMS IWF receives an MSRP SEND request, the SMS IWF:

1. SHALL wait until the entire CPM Chat Message is received according to the procedures as defined in [RFC4975].

NOTE 2: A CPM Chat Message may or may not be received as chunked messages.

2. SHALL generate one or more submit_sm requests based on the received CPM Chat Message and in accordance with [SMPP], with the clarifications given in Table 7 below and with the following clarification:
    a. If the message is too large to be transferred in one SMS message, then SHALL split the message into concatenated submit_sm (s).
    b. Otherwise, continue with the rest of the steps.
3. SHALL send the submit_sm request(s) towards the SM-SC.
4. If no error occurred, SHALL send an MSRP 200 "OK" response according to [RFC4975]. Otherwise, the SMS IWF SHALL respond with an appropriate error response code according to [RFC4975].

NOTE 3: The MSRP 200 “OK” response is sent when all the submit_sm(s) have been sent towards the SM-SC.

When the SMS IWF receives the submit_sm-resp, it SHALL store the message-id parameter received in submit_sm-resp.

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submit_sm parameters	SMPP parameters status	MSRP SEND request(s) [headers from [RFC4975] unless otherwise noted]	Comment
service_type	Mandatory		Set to NULL.
source_addr_ton, source_addr_npi, source_addr	Mandatory		Translated to the corresponding routable address as per section 6.2.2.1.3.
dest_addr_ton, dest_addr_npi, destination_addr	Mandatory		Translated to the corresponding routable target user's address based on To header or Request-URI received in SIP INVITE request.
esm_class	Mandatory		Set to 'Store and Forward' as defined in [SMPP].
protocol_id	Mandatory		Set to the appropriate value defined in [SMPP] based on the network type (e.g., GSM, CDMA).
priority_flag	Mandatory		Set by the IWF based on the service provider policy. NOTE: As different technologies use different priority values, how to map the level of priority between CPM side and SM-SC is network-dependent.
schedule_delivery_time	Mandatory		Set to NULL for immediate delivery.
validity_period	Mandatory		Set to NULL.
replace_if_present_flag	Mandatory		Set to NULL.
data_coding	Mandatory	Content-Type	Set to the corresponding value based on [SMPP] if the character set parameter exists. Otherwise, set to the SM-SC default.
sm_default_msg_id	Mandatory		Set to NULL.
sm_length	Mandatory	Content-Length	Set to the length of the payload of the resulting short message.
short_message	Mandatory	CPIM header: From [RFC3862] and body	If the CPIM header: From is present, its value which contains the actual sender of the MSRP SEND request is included as part of the Content. If requested by service provider policy, service provider generated text indicating instructions on how to leave a session will be included. Additionally Participant Information may also be included according to service provider policy. NOTE 1: The payload needs to be encoded using the encoding scheme indicated by data_coding NOTE 2: The mapping is restricted to only the text.

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sar_msg_ref_num	Optional		Set by the IWF to the total number of concatenated SMs based on [SMPP].
sar_segment_seqnum	Optional		Set by the IWF to the ordering number of each concatenated SM based on [SMPP].
sar_total_segments	Optional		Set by the IWF to the total number of concatenated SMs based on [SMPP].
registered_delivery	Mandatory	imdn.Disposition-Notification [RFC5438]	Set to the corresponding value based on [SMPP] when imdn.Disposition-Notification is set to positive-delivery, negative-delivery, interworking or any combination of them with the following clarification: positive-delivery = xxxxxx01 or interworking = xxxxxx01 negative-delivery = xxxxxx10 If none requested, set to NULL. NOTE: In SMS, "xxxxxx01" corresponds to both positive and negative delivery, while "xxxxxx10" corresponds to negative delivery only.

Table 7: CPM Chat Message to SMS - submit_sm request details

When it is a CPM Chat Message delivery and the SMS IWF receives the deliver_sm as a status report from the SM-SC, then the SMS IWF:

1. Checks if it has a stored message_id (received in submit_sm-resp) that corresponds to the receipted_message_id parameter received in deliver_sm with the following clarification:
    a. If there is no matching message_id, then respond with an error towards the SM-SC setting Command Status header to ESME_RINVMSGID based on [SMPP];
    b. Otherwise, continue with the rest of the steps;
2. Builds an MSRP REPORT message with a delivery notification according to the rules and procedures defined in [RFC4975] with the following clarification:
    a. The message_state parameter received in deliver_sm is translated into the relevant Status header based on service provider policy.
3. It responds with a deliver_sm_resp towards the SM-SC following the rules and procedures in [SMPP].

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6.2.2.1.6 Participant Information to SMS Message Procedures and Parameters mapping

NOTE This section assumes that the IWF subscribed to Participant Information.

When the SMS IWF receives a SIP NOTIFY request, it SHALL convert the SIP NOTIFY request into a submit_sm based on Table 8. If the size of the resulting short message is too large to be sent as a submit_sm, then the payload SHALL be divided into concatenated submit_sm(s). The frequency of sending such information to the SMS user is based on service provider policy.

submit_sm parameters	**SMPP parameters status**	**CPM SIP NOTIFY headers [headers from [RFC3428] unless otherwise noted]**	**Comment**
service_type	Mandatory		Set by the IWF to NULL.
source_addr_ton, source_addr_npi, source_addr	Mandatory	P-Asserted-Identity [RFC3325], if present, otherwise From	Translated by the IWF to the corresponding routable address for the CPM Group Session identity.
dest_addr_ton, dest_addr_npi, destination_addr	Mandatory		Set by the IWF to the MSISDN of the SMS user participating in this session.
esm_class	Mandatory		Set by the IWF to “Store and Forward” as defined in [SMPP].
protocol_id	Mandatory		Set by the IWF to the appropriate value defined in [SMPP] based on the network type (e.g., GSM, CDMA).
priority_flag	Mandatory		Set to the value based on the service provider policy (e.g., non-priority, Level1 priority, Level2 priority or Level3 (highest) priority in the case of GSM (SMS)).
schedule_delivery_time	Mandatory		Set to NULL for immediate delivery.
validity_period	Mandatory		Set to the value based on the service provider policy.
registered_delivery	Mandatory		Set to NULL.
replace_if_present_flag	Mandatory		Set to NULL.
data_coding	Mandatory	Content-Type	Set to NULL.
sm_default_msg_id	Mandatory		Set to NULL.
sm_length	Mandatory	Content-Length	Set to be the length of the payload of the resulting short message.
short_message	Mandatory	body	The body of the SIP NOTIFY request needs to be converted into the corresponding text based on service provider policy. NOTE: The mapping is restricted to only the text.
sar_msg_ref_num	Optional		Set by the IWF to the newly generated reference number to the concatenated SMs based on [SMPP].

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sar_segment_seqnum	Optional		Set by the IWF to the ordering number of each concatenated SM based on [SMPP].
sar_total_segments	Optional		Set by the IWF to the total number of concatenated SMs based on [SMPP].

Table 8: SIP NOTIFY request to submit_sm parameters mapping

6.2.2.2 SMS to CPM

The handling of the SMS IWF for interworking SMS messages to CPM requests is as follows:

- When the SMS IWF receives a Short Message (deliver_sm [SMPP]) from an SM-SC that needs to be interworked to a CPM Standalone Message with a size smaller than or equal to 1300 bytes, it SHALL handle the Short Message as described in section 6.2.2.2.1 "*SMS Message to Pager Mode CPM Standalone Message*".
- When the SMS IWF receives concatenated Short Messages from an SM-SC that need to be interworked to a CPM Standalone Message with a size bigger than 1300 bytes, it SHALL handle Short Messages as described in section 6.2.2.2.3 "*SMS Message to Large Message Mode CPM Standalone Message*".
- When the SMS IWF receives a Short Message (deliver_sm [SMPP]) from an SM-SC that can be interworked to a CPM Chat Message within an existing CPM Session, it SHALL handle the Short Message as described in section 6.2.2.2.2 *"SMS Message to CPM Chat Message"*.
- When the SMS IWF receives a Short Message (deliver_sm [SMPP]) from an SM-SC that can be interworked to a CPM Session leaving request, it SHALL handle the Short Message as described in section 6.2.2.2.4 "*SMS Message to CPM Session leaving request*".

6.2.2.2.1 SMS Message to Pager Mode CPM Standalone Message

When the SMS IWF receives a deliver_sm from SM-SC, it SHALL perform the following:

1. If the received deliver_sm is a concatenated message, then SMS IWF SHALL wait for the rest of the concatenated deliver_sm's based on sar_msg_ref_num, sar_segment_seqnum and sar_total_segments parameters.
2. If the size of the received payload of SMS message(s) can be sent as one SIP MESSAGE request, then the SMS IWF SHALL generate SIP MESSAGE request based on the information in the received deliver_sm and in accordance with section 7.2.1 of [OMA-CPM-TS-Conv-Func], with the clarifications given in Table 9 below.
3. SHALL send the SIP MESSAGE request towards the CPM Client according to the rules and procedures of the SIP/IP core.

When the SMS IWF receives the SIP response, it SHALL generate a deliver_sm_resp based on the received SIP response and in accordance with [SMPP], with the clarifications given in Table 10 below, and send it towards the SM-SC.

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CPM SIP MESSAGE headers [headers from [RFC3428] unless otherwise noted]	CPM Headers status	deliver_sm parameters	Comment
Content-Language	Optional	language_indicator	
Content-Length	Optional	sm_length	
Content-Type	Mandatory	data_coding	Set to 'text/plain' and character set parameter is set along with the received SMS parameter by the IWF.
P-Asserted-Identity [RFC3325] and/or From	Mandatory	source_addr_ton, source_addr_npi, source_addr	Translated by the IWF to the corresponding routable originating user's address. NOTE: If a SIP URI is available, the IWF will include it in the From and P-Asserted-Identity headers. The IWF will translate the MSISDN into a TEL URI and insert it in the P-Asserted-Identity header. If a SIP URI is not available, the IWF will translate MSISDN into a TEL URI and insert it in the From and P-Asserted-Identity headers. The IWF SHALL include a Non-CPM Communication Service Identifier as defined in Appendix D with the value set to "SMS".
Priority	Optional	priority_flag	Set to corresponding value of the received deliver_sm (e.g., 0=non-urgent; 1=normal; 2=urgent; in the case of GSM (SMS)). NOTE: As different technologies use different priority values, how to map the level of priority accordingly between CPM side and SM-SC side is network-dependent.
To and Request-URI	Mandatory	dest_addr_ton, dest_addr_npi, destination_addr	Translated by the IWF to the corresponding routable target CPM User's address. NOTE: the IWF will use SIP URI if available, and otherwise translate MSISDN into TEL URI.
User-Agent	Mandatory		Set to the OMA CPM IWF release version of the IWF as specified in Appendix C "*Release Version in User-Agent and Server Headers*".

Table 9: SMS to Pager Mode CPM Standalone Message - SIP MESSAGE request details

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deliver_sm_resp Header	CPM SIP MESSAGE response headers	Comment
command_status	Response code	Set command_status header accordingly based on Response code, e.g., – Set 0x0 if 202 “Accepted” is received – Set 0xB if 404 “Not Found” is received – Set 0x64 if 503 “Service Unavailable” is received – Set 0x65 if 403 “Forbidden” is received
sequence_number		Set by the SMS IWF to the received value in deliver_sm.

Table 10: SMS to Pager Mode CPM Standalone Message – deliver_sm_resp details

6.2.2.2.2 SMS Message to CPM Chat Message

NOTE 1: This section assumes that a CPM Session has been established with the IWF on behalf of the SMS user.

When the IWF receives a deliver_sm from the SM-SC, it SHALL perform the following:

1. If the received deliver_sm is a concatenated message, then the IWF waits for the rest of the concatenated deliver_sm’s based on sar_msg_ref_num, sar_segment_seqnum and sar_total_segments parameters.
2. Once all of the concatenated deliver_sm have been received, the IWF generates one or more MSRP SEND request(s) based on [RFC4975] with the following clarifications:
    a. The IWF SHALL set the content-type as Content-Type=message/cpim.
    b. The IWF MAY set Success-Report and/or Failure-Report headers based on the service provider’s policy in the case of Session Mode Message Delivery.
    c. The payload of the CPIM body in the MSRP SEND request(s) SHALL be restricted to text only.

NOTE 2: More than one MSRP SEND request is generated when the CPM Chat Message is sent in multiple chunks.

3. The IWF SHALL send the MSRP SEND request(s) towards the CPM Client.

Upon receiving the final MSRP response, the IWF:

1. SHALL set the command_status header value of the deliver_sm_resp along with the Response_code of the final MSRP response.
2. SHALL send the deliver_sm_resp towards the SM-SC.

6.2.2.2.3 SMS Message to Large Message Mode CPM Standalone Message

When the SMS IWF receives a deliver_sm from SM-SC, it performs the following:

1. If the received deliver_sm is a concatenated message, then the SMS IWF SHALL wait for the rest of the concatenated deliver_sm’s based on sar_msg_ref_num, sar_segment_seqnum and sar_total_segments parameters.
2. If the size of the received payload of SMS messages is too large to be sent as one SIP MESSAGE request and there is no established MSRP session for that message, then the SMS IWF SHALL generate a SIP INVITE request according to section 7.2.1.2 “*Sending a Large Message Mode CPM Standalone Message*” of [OMA-CPM-TS-Conv-Func] with the clarifications given in Table 11 below.
3. The IWF SHALL send the SIP INVITE request towards the CPM Client according to the rules and procedures of the SIP/IP core.

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4. After the MSRP session has been established, the payload is sent in one or more MSRP SEND request(s) as defined in 6.2.2.2.2 *"SMS Message to CPM Chat Message"*.

After the payload has been sent, the SMS IWF SHALL finish the MSRP session by sending a SIP BYE request towards the CPM Client according to rules and procedures of [RFC3261].

SIP INVITE headers [headers from [RFC3261] unless otherwise noted]	CPM Headers status	deliver_sm parameters	Comment
To and Request-URI	Mandatory	dest_addr_ton, dest_addr_npi, destination_addr	Translated by the IWF to the corresponding routable target CPM User's address. NOTE: the IWF will use SIP URI if available, and otherwise translate MSISDN into TEL URI for To and Request-URI headers.
P-Asserted-Identity [RFC3325] and/or From	Mandatory	source_addr_ton, source_addr_npi, source_addr	Translated by the IWF to the corresponding routable originating user's address. NOTE: If a SIP URI is available, the IWF will include it in the From and P-Asserted-Identity headers. The IWF will translate the MSISDN into a TEL URI and insert it in the P-Asserted-Identity header. If a SIP URI is not available, the IWF will translate MSISDN into a TEL URI and insert it in the From and P-Asserted-Identity headers.
Call-ID	Mandatory		Set by the IWF according to [RFC3261]
CSeq	Mandatory		Set by the IWF according to [RFC3261].
Max-Forwards	Mandatory		Set by the IWF according to [RFC3261].
Via	Mandatory		Set to the address of the IWF.
Contact	Mandatory		Set by the IWF including the CPM Feature Tag according to Appendix H of the [OMA-CPM-TS-Conv-Func] and [RFC3841].
Content-Type	Mandatory		Set by the IWF to "application/sdp".
Accept-Contact	Mandatory		Set by the IWF including the CPM Feature Tag (i.e., "3gpp-service.ims.icsi.oma.cpm.largemsg") according to Appendix H of the [OMA-CPM-TS-Conv-Func] and [RFC3841].
Expires	Optional		Set by the IWF according to service provider policy.
Date	Optional		Set by the IWF to the current date and time.
User-Agent	Mandatory		Set to the OMA CPM IWF release version as specified in Appendix C "*Release Version in User-Agent and Server Headers*".

Table 11: SMS to Large Message Mode CPM Standalone Message - SIP INVITE request details

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6.2.2.2.4 SMS Message to CPM Session leaving request

When the SMS IWF receives a deliver_sm from the SM-SC and if there is a corresponding CPM Session, the SMS IWF performs the following procedures:

1. SHALL check if the received payload of SMS message is matched with the pre-defined text requesting to leave the CPM Group Session or CPM 1-1 Session.

NOTE: The exact text for a session leaving request shall be defined by the service provider. The SMS user may be prompted with the pre-defined text, for instance, during either session establishment or during the session based on the service provider policy.

2. If matched, the SMS IWF SHALL generate a SIP BYE request based on the received deliver_sm request and [RFC3261] with the clarifications given in Table 12. Otherwise, the received message SHALL be handled as defined in 6.2.2.2.2 *"SMS Message to CPM Chat Message"*.
3. SHALL send the SIP BYE request towards the CPM Client according to the rules and procedures of the SIP/IP core.
4. SHALL release all Media Plane resources corresponding to the CPM Session being closed.

6.2.3 Unsuccessful SMS delivery

The CPM Interworking Function SHALL determine that an interworked CPM Standalone Message, or CPM Session, or its CPM Chat Messages, had failed to reach the UE via SMS delivery in CS domain in any one of the following scenarios:

a) If the recipient CPM User was absent in HLR at the time the CPM Interworking Function interrogated the HLR (e.g. MAP: SRI SMS) for routing address for SMS delivery; or

b) a failure SMS Delivery report (i.e. containing an User error parameter) is received by the CPM Interworking Function for a previous SMS delivery request. In that case, the User error parameter mapping to SIP response error codes from [3GPP 29.311] table 6.1.5.4.1.1. applies with the following changes:

Value of the User error parameter	SIP response Status code
Illegal Subscriber indicates that delivery of the mobile terminated Short Message failed because the mobile station failed authentication	480 Temporarily unavailable (instead of 500 Server Internal error)
Illegal equipment indicates that delivery of the mobile terminated Short Message failed because an IMEI check failed, i.e. the IMEI was blacklisted or not white-listed;	480 Temporarily unavailable (instead of 500 Server Internal error)
System Failure	480 Temporarily unavailable (instead of 500 Server Internal error)

c) a SMS Status report containing failure result is received by the CPM Interworking Function for a previous SMS delivery request. In that case, the parameter mapping between TP-Status element and the delivery reports IMDN applies from [3GPP 29.311] table 6.1.6.5.1.

In all the above cases, the CPM Interworking Function sends:

1) a "negative-delivery" IMDN, if one was requested; or

2) if no IMDN, or an IMDN with only "positive-delivery" was requested, then the CPM Interworking Function SHALL notify the CPM Participating Function that the SMS delivery has failed via the CPM Event Reporting Framework, following the procedures described in section 6.7 "*CPM Event Reporting Framework*" and its sub-sections in [OMA-CPM-TS-Conv-Func]. The CPM Interworking Function SHALL generate a SIP MESSAGE request as described in section 6.2.3.2 "*CPM Interworking Events handling*", with the following event data in the body:

    i. SHALL populate the event data in the <failed-iw> element of the <cpm-event-iw> event, including the following:

        1. the Authenticated CPM User's address in the <cpm-user-address> element, and;

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2. the <message-id> element containing the IMDN.message-id of the message for which the interworked delivery has failed, as originally received from the CPM Participating Function.

For interworking of CPM requests to SMS:

A. If the SMS delivery failure occurred before CPM Interworking Function has sent a SIP answer back to the CPM ISF (hence to CPM Participating Function), then the CPM Interworking Function SHALL return a SIP 480 response to CPM Participating Function, which indicates a temporary SMS delivery issue. This allows the CPM Participating Function to trigger the deferral procedures, if applicable, for a delivery at a later time. The SIP 480 response SHALL be sent in one of the following cases:

   1) If the recipient CPM User was absent in HLR at the time the CPM Interworking Function interrogated the HLR (e.g. MAP: SRI SMS) for routing address for SMS delivery; or

   2) If the recipient was registered/attached and CPM Interworking Function received the routing information for SMS delivery from the HLR, but the SMS delivery failed afterwards due to inability to reach the CPM User (e.g. UE in a tunnel);

B. If the SMS delivery fails for a message that was interworked from an MSRP message received from the CPM Participating Function, the CPM Interworking Function SHALL send a MSRP 413 response back, followed by a SIP BYE request where it SHALL include a Reason header field with a value set to SIP;cause=480; and MAY have a text parameter containing an explanatory String (e.g."Bearer unavailable", or other). When a response to the SIP BYE is received, the CPM Interworking Function SHALL release the Media Plane resources associated with that SIP session.

For all above cases, the CPM Interworking Function SHALL report the unsuccessful SMS Delivery further to the HLR/HSS, via a Report SM Delivery Status message (e.g. REPORT-SM-DELIVERY-STATUS over MAP defined in [3GPP TS 29.002]) with the following clarifications:

   a) The CPM Interworking Function SHALL include its own address, set as the SMS-SC address parameter, in the Report SM Delivery Status message to the HSS/HLR, in order to be alerted when the user becomes ready to receive SMS again.

6.2.3.1 Alert procedure when UE is available for SMS

At any time after the unsuccessful SMS delivery attempt, the CPM User's UE may regain connectivity (i.e. attach in the PS and/or CS domain) again, in which case the HLR/HSS becomes aware that the CPM User can receive SMS as described in [3GPP TS 23.040].

The HLR/HSS initiates an "Alert Service Centre" procedure to the CPM Interworking Function if the HLR/HSS has previously recorded the Messages Waiting Data (MWD), with a failure reason that the message failed to be sent by CPM Interworking Function due to the CPM User's UE not being available.

Upon receiving the "Alert Service Centre" message, the CPM Interworking Function SHALL generate a SIP MESSAGE request as described in section 6.2.3.2 "*CPM Interworking Events handling*", with the CPM event reporting framework content, following the procedures described in section 6.7 "*CPM Event Reporting Framework*" and its sub-sections in [OMA-CPM-TS-Conv-Func]. The CPM Interworking Function SHALL use the interworking event <ready-for-sms> element, as defined in the section 6.7.5.2 "*CPM Interworking Events*" of the [OMA-CPM-TS-Conv-Func]:

– It SHALL populate the Authenticated CPM User's address in the <cpm-user-address> element.

6.2.3.2 CPM Interworking Events handling

When the CPM Interworking Function needs to send CPM interworking event information to the CPM Participating Function, it SHALL generate a SIP MESSAGE request, as follows:

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1) SHALL populate the service identification for CPM Event Reporting in the Accept-Contact, and in the P-Asserted-Service header fields, as defined in section 6.7.1 "*Service Identification*" of [OMA-CPM-TS-Conv-Func];
2) SHALL set the From and the P-Asserted-Id header fields to the CPM IWF own address (e.g. CPM-IWF@ ims.mnc<MNC>.mcc<MCC>.3gppnetwork.org");
3) SHALL set the To header field and the Request-URI to the FQDN address of the CPM Participating Function (e.g. "CPM-PF@ims.mnc<MNC>.mcc<MCC>.3gppnetwork.org");
4) SHALL set the User-Agent header field to the OMA CPM IWF release version of the IWF, as specified in Appendix C "*Release Version in User-Agent and Server Headers*";
5) SHALL populate the Content-Type header field with the CPM Event Reporting Content-Type as defined in section 6.7.3 "*CPM Event Reporting Data Format*";
6) SHALL populate the appropriate event data in the body of the SIP MESSAGE request, in the child(ren) element(s) of the <cpm-event-iw> event.

6.2.4 Successful SMS delivery

Upon a successful SMS delivery, the CPM Interworking Function SHALL provide the following information to the CPM Participating Function:

1) If an IMDN interworking delivery notification was requested, it SHALL populate the sub-element <status> of the <interworking-notification> element with the child element <legacy-sms> defined in the Appendix of the [OMA-CPM-TS-Conv-Func], to indicate that the delivery was successfully done via non-CPM technology i.e. SMS;

2) SHALL send the IMDN to the CPM Participating Function via one of the following methods:

    a. via MSRP SEND, as described in section 5.4.1 "*Generate Delivery Notifications*" of the [OMA-CPM-TS-Conv-Func], if the IMDN is associated with an interworked CPM Chat Message and the IWF is still in the CPM Session with CPM Participating Function, then it SHALL send the IMDN; or

    b. via SIP MESSAGE, as described in section 5.4.1 "*Generate Delivery Notifications*" of the [OMA-CPM-TS-Conv-Func], if the IMDN is not associated with an interworked CPM Chat Message, or if it is but the IWF is no longer in the CPM Session with CPM Participating Function.

The IWF SHALL send to the CPM Participating Function in:

A) the 200 "OK" SIP response to a SIP MESSAGE request for a Pager Mode CPM Standalone Message; or

B) the 200 "OK" SIP response to a SIP BYE request for a Large Message CPM Standalone Message; or

the following SIP header fields defined in Appendix C of [OMA-CPM-TS-Conv-Func]:

1. The Message-Context MIME header field set to the value of:
    a. "pager-message", indicating that SMS was used for that message;
2. The Message-Correlator set to the value of:
    a. the SMS fingerprint for that CPM Message, calculated as described in Appendix F.

The IWF SHALL send to the CPM Participating Function in:

A) the 200 "OK" SIP response to a SIP INVITE request for a CPM Session;

the following SIP header fields defined in Appendix C of [OMA-CPM-TS-Conv-Func]:

a) The Message-Context MIME header field set to the value of:
    i. "pager-message", indicating that SMS was used for that message.

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6.3 Interworking with MMS

When interworking messages between CPM and MMS, with respect to handling SMIL content, since MMS supports SMIL [3GPP TS26.140] compatible with CPM [3GPP TS26.141]:

- When interworking messages from CPM to MMS, the IWF receiving a message (that either uses SMIL for media synchronization and scene description, or not) SHALL provide it to MMS unmodified.
- When interworking messages from MMS to CPM, the IWF receiving an MMS (that either uses SMIL for media synchronization and scene description, or not) SHALL provide it to CPM unmodified.

6.3.1 MM4 Realization

The MMS IWF is acting as an MMS relay server node in the MMS network (see [3GPP TS23.140] and/or [X.S0016-000]).

Figure 2 shows the architecture and protocols used for interworking between CPM and MMS.

Figure 2 CPM-MMS interworking architecture

The MM4 interface consists of three message groups that are supported by the IWF:

- The MM4 Forward Request and Response messages;
- The MM4 Delivery Report Request and Response messages;
- The MM4 Read Reply request and Response messages.

The IWF SHALL be able to translate CPM Standalone Messages to MM4 messages and MM4 messages to CPM Standalone Messages as described in the following sections.

NOTE: The tables in the following sections contain a description of the parameters that are necessary for CPM to/from MM4 interworking. Not all of the CPM or MMS parameters are needed for interworking.

NOTE: Interworking may occur in either the originating or terminating network as defined in [OMA-CPM-TS-Conv-Func].

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6.3.1.1 Interworking from CPM to MMS

When the MMS IWF receives a CPM request that is to be sent to an MMS user, it SHALL determine the address of the recipient's MMS Relay/Server (e.g., via an ENUM/DNS query).

In general the handling of the MMS IWF for interworking CPM requests to MMS messages is as follows:

- When the MMS IWF receives a Pager Mode CPM Standalone Message (i.e., a SIP MESSAGE request containing the CPM Feature Tag "3gpp-service.ims.icsi.oma.cpm.msg") it SHALL handle the Pager Mode CPM Standalone Message as described in section 6.3.1.1.1 *"Pager Mode CPM Standalone Message to MMS Message"*.
- When the MMS IWF receives a Large Message Mode CPM Standalone Message (i.e., a SIP INVITE request containing the CPM Feature Tag "3gpp-service.ims.icsi.oma.cpm.largemsg"), it SHALL handle the Large Message Mode CPM Standalone Message as described in section 6.3.1.1.2 *"Large Message Mode CPM Standalone Message to MMS Message"*.
- When the MMS IWF receives from the MMS network an MMS delivery notification (i.e., an MM4_delivery_report.REQ [3GPP TS23.140]) that is associated with a previously interworked CPM Standalone Message, it SHALL handle the MMS delivery notification as described in section 6.3.1.1.3 *"MMS Delivery Report to CPM Disposition Notification"*.
- When the MMS IWF receives from the MMS network an MMS read reply (i.e., an MM4_read_reply.REQ [3GPP TS23.140]) that is associated with a previously interworked CPM Standalone Message, it SHALL handle the MMS read reply as described in section 6.3.1.1.4 *"MMS Read Reply to CPM Standalone Message Disposition Notification"*.
- When the MMS IWF receives a CPM File Transfer (i.e., a SIP INVITE request containing the CPM Feature Tag "3gpp-service.ims.icsi.oma.cpm.filetransfer"), it SHALL handle the CPM File Transfer as defined in section 6.3.1.1.5 *"CPM File Transfer to MMS Message"*.
- When the MMS IWF receives a CPM Session Invitation (i.e., a SIP INVITE request containing the CPM Feature Tag "3gpp-service.ims.isci.oma.cpm.session"), it SHALL handle the CPM Session as defined in section 6.3.1.1.6.1 *"CPM Session Invitation to MMS Message"*, 6.3.1.1.6.2 *"CPM Chat Message to MMS Message"*, 6.3.1.1.6.4 *"CPM-Originated Session Leaving request "*, and 6.3.1.1.6.6 *"Sending Participant Information to MMS User"*.

6.3.1.1.1 Pager Mode CPM Standalone Message to MMS Message

When the IWF receives a Pager Mode CPM Standalone Message, carried as a SIP MESSAGE message request containing the CPM Feature Tag "3gpp-service.ims.icsi.oma.cpm.msg", it SHALL perform the following:

1. It determines the address of the recipient's MMS relay server in his home network.
2. It generates an MM4_forward.REQ request based on the received Pager Mode CPM Standalone Message and in accordance with [3GPP TS23.140], with the clarifications given in Table 13 below.
3. It sends the MM4_forward.REQ message in an SMTP transaction with the details as described in Table 12 below.
4. Upon receipt of the corresponding MM4_forward.RES message, it generates a SIP response message based on the MM4_forward.RES response and in accordance with [RFC3428], with the clarifications given in Table 14 below.

SMTP Command	**CPM SIP MESSAGE header**	**Comment**
MAIL From	P-Asserted-Identity [RFC3325], if present, otherwise, From	Interworked by the MMS IWF (to get an MMS useable format).

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RCPT To:	Request-URI	Interworked by the MMS IWF.
DATA		The generated MM4_forwards.REQ request (Table 13).

Table 12: Pager Mode CPM Standalone Message to MMS - SMTP transaction details

MM4 Information element	MM4 Parameter status	CPM SIP MESSAGE header [headers from [RFC3428] unless otherwise noted]	Comment
3GPP MMS Version	Mandatory		Set according to the MMS protocol version supported by the IWF.
Message Type	Mandatory		Set to “MM4_forward.REQ”
Transaction ID	Mandatory		Unique transaction identifier generated by the IWF.
Message ID	Mandatory	Conversation-ID and Contribution-ID.	IWF generated unique ID for the message, related to the Conversation-ID and the Contribution-ID.
Recipient(s) address	Mandatory	Request-URI (when sent to one recipient or when sent to a CPM Pre-defined Group) URI list body carrying the “recipient-list-history” [RFC5365] (when sent to more than one recipient)	Interwork the recipient(s) address either from the value of the “Request-URI” header (in case of one recipient or when sent to a CPM Pre-defined group) or from the list of recipients in the “URI-List” in the case of multiple recipients. The URIs with copyControl="to" are mapped to the MM4 Recipient(s) Address To: header (as defined in [STD11]). The URIs with copyControl="cc" are mapped to the MM4 Recipient(s) Address Cc: header (as defined in [STD11]).
Sender address	Mandatory	P-Asserted-Identity [RFC3325], if present, otherwise, From	NOTE: When the Privacy header is set to “id”, the From header value might be set to an anonymous URI according to [RFC3323]. In this case the MMS client will route its delivery report and read reply report as best effort.
Content type	Mandatory	Content-Type	
Date and time	Mandatory	Date or CPIM header: DateTime [RFC5438]	Set the MMS date and time to, in order of preference: – CPIM header: DateTime if available, otherwise, – the Date of the SIP MESSAGE request if available, otherwise, – the current date and time at the IWF.
Time of Expiry	Conditional	Expires	Set to received value in “Expires” otherwise set according to service provider policy.
Delivery report	Conditional	imdn.Disposition-Notification [RFC5438]	Set to true when Disposition Notification is requested with value set to “positive-delivery”, “negative-delivery”, “interworking” or any combination of them.

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Priority	Conditional	Priority	Set to corresponding value of CPM Standalone Message: non-urgent= low normal= medium urgent= high
Sender visibility	Conditional	Privacy header [RFC3323] and [RFC3325]	Set if Privacy header value is present and set as per [RFC3323] and [RFC3325] (e.g., Privacy: id).
Read reply	Conditional	imdn.Disposition_Notification: display [RFC5438]	When the incoming imdn Disposition-Notification is set to “display”, then set the Read reply to “Yes”.
Subject	Conditional	Subject	Set only if “Subject” header is set in CPM Standalone Message.
Acknowledgement Request	Optional		Always set to yes since SIP MESSAGE request must be acknowledged.
Forward counter	Conditional		Set per service provider policy.
Originator-System-Address	Optional		Set by the IWF to its own address, formatted as an MMS R/S address.
Forward-Route	Optional		Set by the IWF to its own address, formatted as an MMS R/S address.
Content	Conditional	Body	Set to corresponding body types received in SIP MESSAGE request body.

Table 13: Pager Mode CPM Standalone Message to MMS - MM4_forward.REQ details

CPM SIP MESSAGE response header [headers from [RFC3428] unless otherwise noted]	CPM Header status	MM4 Information element	Comment
Server	Mandatory		Set to the OMA CPM IWF release version of the IWF as specified in Appendix C “*Release Version in User-Agent and Server Headers*”.
response code [RFC3261] reason phrase [RFC3261]	Mandatory	Request Status	Set the response code and reason phrase according to the Request Status. – 202 “Accepted” when X-Mms-Request-Status-Code is "OK" – If Request Status is: "Error-unspecified" or "Error-network-problem", set response code to “400”, and reason phrase to "Bad request" – If Request status is: "Error-service-denied", set response code to "403", and reason phrase to “Forbidden”

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			– If Request Status is: "Error-content-not-accepted" or "Error-message-format-corrupt", set response code to "415", and reason phrase to "Unsupported Media Type".
Call-ID	Mandatory		Set per the Call-ID header field received in the CPM Standalone Message.
To	Mandatory		Set per the To header field received in the CPM Standalone Message.
Via	Mandatory		Set per the Via header field received in the CPM Standalone Message.
From	Mandatory		Set per the From header field received in the CPM Standalone Message.
CSeq	Mandatory		Set per the CSeq header field received in the CPM Standalone Message.
Content-Length	Mandatory		Set to 0.

Table 14: Pager Mode CPM Standalone Message to MMS – SIP response details

6.3.1.1.2 Large Message Mode CPM Standalone Message to MMS Message

When the IWF receives a SIP INVITE request containing the CPM Feature Tag “3gpp-service.ims.icsi.oma.cpm.largemsg” for a Large Message Mode CPM Standalone Message, it SHALL send a 200 "OK" response if no errors are found in the SIP INVITE request or an appropriate error response otherwise.

When the IWF subsequently receives an MSRP SEND request, it SHALL perform the following:

1. It waits until all MSRP SEND request(s) for the Large Message Mode CPM Standalone Message have been received (based on the Byte-Range header in the MSRP SEND request(s)),
2. The IWF determines the address of the recipient’s MMS relay server in his home network.
3. The IWF generates an MM4_forward.REQ request based on the received Large Message Mode CPM Standalone Message and in accordance with [3GPP TS23.140], with the clarifications given in Table 16 below.
4. The IWF sends the MM4_forward.REQ request to the recipient in an SMTP transaction, with the clarifications given in Table 15 below,
5. When an acknowledgement has been requested in the MM4_forward.REQ upon receipt of the MM4_forward.RES, and the IWF receives a negative response and a delivery notification was requested by the sender, it composes a delivery notification message as shown in 6.3.1.1.3.

NOTE: If a delivery notification was requested, the IWF must wait for the MM4_delivery_report message and then send the delivery notification using a SIP MESSAGE request that contains the message identifier and the delivery notification (see: 6.3.1.1.3 in this document, and 7.2.4 “*Disposition Notification*” of [OMA-CPM-TS-Conv-Func]).

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SMTP/MM4_forward.REQ	SIP INVITE header	Comment
MAIL From	P-Asserted-Identity [RFC3325], if present, otherwise, From	Interworked by the MMS IWF (to get an MMS useable format).
RCPT To:	Request-URI	Interworked by the MMS IWF.
DATA		The generated MM4_forward.REQ request (Table 16).

Table 15: Large Message Mode CPM Standalone Message to MMS - SMTP transaction details

MM4 Information element	MM4 Parameter status	CPM headers [headers from SIP INVITE [RFC3261] or MSRP [RFC4975] unless otherwise noted]	Comment
3GPP MMS Version	Mandatory		Set according to the MMS protocol version supported by the IWF.
Message Type	Mandatory		Set to “MM4_forward.REQ”.
Transaction ID	Mandatory		Unique transaction identifier generated by the IWF.
Message ID	Mandatory	Conversation-ID and Contribution-ID	IWF generated unique ID for the message, related to the Conversation-ID and the Contribution-ID
Recipient(s) address	Mandatory	Request-URI (when sent to one recipient or when sent to a CPM Pre-defined Group) URI list body carrying the “recipient-list-history” [RFC5366] (when sent to more than one recipient)	Interwork the recipient(s) address either from the value of the “Request-URI” header (in case of one recipient or when sent to a CPM Pre-defined group) or from the list of recipients in the “URI-List” in case of multiple recipients. The URIs with copyControl="to" are mapped to the MM4 Recipient(s) Address To: header (as defined in [STD11]). The URIs with copyControl="cc" are mapped to the MM4 Recipient(s) Address Cc: header (as defined in [STD11]).
Sender address	Mandatory	P-Asserted-Identity [RFC3325], if present, otherwise, From	NOTE: When the Privacy header is set to “id”, the From header might be set to an anonymous URI according to [RFC3323]. In this case the MMS client will route its delivery report and read reply report as best effort.
Content type	Mandatory	Content-Type	

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Date and time	Mandatory	Date or CPIM header: DateTime [RFC5438]	Set the MMS date and time to, in order of preference: – CPIM header: DateTime if available, otherwise, – the Date of the SIP INVITE request if available, otherwise, – the current date and time at the IWF.
Time of Expiry	Conditional	Message-Expires (see [OMA-CPM-TS-Conv-Func])	May be set by service provider policy if Message-Expires is not provided.
Delivery report	Conditional	imdn.Disposition-Notification [RFC5438]	When the Disposition-Notification is set to at least one of the following values: “positive-delivery”, “negative-delivery”, “interworking” then set the Delivery report to “Yes”.
Read reply	Conditional	imdn.Disposition-Notification: display [RFC5438]	When the Disposition-Notification is set to “display”, set the Read reply to “Yes”.
Sender visibility	Conditional	Privacy header [RFC3323] and [RFC3325].	Set if Privacy header value is present and set as per [RFC3323] and [RFC3325] (e.g., Privacy: id).
Subject	Conditional	Subject	Set only if “Subject” header is set in the Large Message Mode CPM Standalone Message.
Acknowledgement Request	Optional		Set per service provider policy.
Forward counter	Conditional		Set per service provider policy.
Originator-System-Address	Optional		Set by the IWF to its own address, formatted as an MMS R/S address.
Forward-Route	Optional		Set by the IWF to its own address, formatted as an MMS R/S address.
Content	Conditional		Set per the payload received via MSRP.

Table 16: Large Message Mode CPM Standalone Message to MMS - MM4_forward.REQ details

6.3.1.1.3 MMS Delivery Report to CPM Disposition Notification

When the IWF receives an MM4_delivery_report.REQ, it SHALL perform the following:

1. If a positive-delivery or a negative-delivery were requested in the original CPM request, then:
    a. It generates a delivery notification based on the received MM4_delivery_report.REQ and in accordance with [RFC3862] and [RFC5438], with the clarifications given in Table 17 below. The CPIM body per [RFC3862] carries a disposition notification XML document. The MIME type of the Disposition Notification XML document is "message/imdn+xml".
2. If an IMDN interworking delivery notification was requested, it SHALL populate the sub-element <status> of the <interworking-notification> element with the child element <legacy-mms> as defined in the Appendix O. of the [OMA-CPM-TS-Conv-Func], to indicate that the delivery was successfully done via MMS;

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3. SHALL send the IMDN to the CPM Participating Function via one of the following methods:
    a. via MSRP SEND, as described in section 5.4.1 "*Generate Delivery Notifications*" of the [OMA-CPM-TS-Conv-Func], if the IMDN is associated with an interworked CPM Chat Message and the IWF is still in the CPM Session with CPM Participating Function; or
    b. via SIP MESSAGE, as described in section 5.4.1 "*Generate Delivery Notifications*" of the [OMA-CPM-TS-Conv-Func], if the IMDN is not associated with an interworked CPM Chat Message, or if it is, but the IWF is no longer in the CPM Session with CPM Participating Function.
4. It generates an MM4_delivery_report.RES response in accordance with [3GPP TS23.140], with the clarifications given in Table 19 below.
5. It sends the MM4_delivery_report.RES in an SMTP transaction, with the clarifications given in Table 18 below.

CPM Delivery Notification SIP header, CPIM header and payload information elements **[headers from [RFC3261], [RFC3862], and [RFC5438] unless otherwise noted]**	**CPM Header status**	**MM4 Information element**	**Comment**
For SIP MESSAGE: User-Agent	Mandatory		Set to the OMA CPM IWF release version of the IWF as specified in Appendix C "*Release Version in User-Agent and Server Headers*".
For SIP MESSAGE: SIP header: P-Asserted-Identity [RFC3325] and/or For both MSRP SEND and SIP MESSAGE: From CPIM header: From	Mandatory	Recipient Address	NOTE: If a SIP URI is available, the IWF will include it in the From and P-Asserted-Identity headers. The IWF will translate the MSISDN into a TEL URI and insert it in the P-Asserted-Identity header. If a SIP URI is not available, the IWF will translate MSISDN into a TEL URI and insert it in the From and P-Asserted-Identity headers.
For SIP MESSAGE: SIP header: To SIP Header: Request-URI For both MSRP SEND and SIP MESSAGE: CPIM header: To	Mandatory	Sender Address	Set SIP:To, and Request-URI to "Sender Address" information element. In the case the received CPM Standalone Message this IMDN relates to contained a "Referred-by" header, set CPIM: To to the "Referred-By" header received in the CPM Standalone Message this disposition notification relates to. Otherwise set CPIM: To to "Sender Address" information element. NOTE: the IWF will use SIP URI if available, and otherwise translate MSISDN into TEL URI for SIP To, Request-URI and CPIM To headers.

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For both MSRP SEND and SIP MESSAGE: CPIM header: Content-Disposition XML body: <delivery-notification> <processing-notification> <interworking-notification>	Mandatory	MM Status	Set CPIM:Content-Disposition header to ":notification". Set the following elements to the corresponding value of MM4_delivery_report: a) the <interworking-notification> XML element, to include the appropriate element under <status> (report (X-Mms-MM-Status-Code: Retrieved = legacy-mms; Rejected = failed, expired=failed, unrecognized=failed); and/or b) the <delivery notification> XML element (X-Mms-MM-Status-Code: Retrieved = delivered; Rejected = failed, expired=failed, unrecognized=failed) and/or c) the <processing-notification> XML element (X-Mms-MM-Status-Code: Indeterminate = processed, forwarded=processed, deferred=stored).
For both MSRP SEND and SIP MESSAGE: CPIM header: Message-ID	Mandatory		Set to a message id newly generated by the IWF based on [RFC5438].
For both MSRP SEND and SIP MESSAGE: CPIM header: IMDN-Route	Conditional		Set CPIM:IMDN-Route header according to IMDN-Record-Route header received in the corresponding CPM Standalone Message.
For both MSRP SEND and SIP MESSAGE: XML body: <original-recipient-uri>	Conditional		If the CPM Standalone Message recipient is a CPM Ad-hoc Group member, set <original-recipient-uri> element according to Original-To header (if present) received in the corresponding CPM Standalone Message.
For both MSRP SEND and SIP MESSAGE: XML body: <message-id>	Mandatory		Set <message-id> element to Message-ID header received in the corresponding CPM Standalone Message that triggered the delivery report.
For both MSRP SEND and SIP MESSAGE: XML body: <recipient-uri>	Optional		Set by the IWF according to [RFC5438] (i.e., set to CPIM To header received in the corresponding CPM Standalone Message).
For SIP MESSAGE: SIP header: Date	Optional	Date and Time	Set the Date per the MM4 Date and Time.
For both MSRP SEND and SIP MESSAGE: XML body: <datetime>	Mandatory		Set the XML body: <datetime> to the CPIM DateTime received in the corresponding CPM Standalone Message.

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For SIP MESSAGE: SIP header: Call-ID	Mandatory		Set by the IWF according to [RFC3261].
For SIP MESSAGE: SIP header: CSeq	Mandatory		Set by the IWF according to [RFC3261].
For SIP MESSAGE: SIP header: Content-Type	Mandatory		Set SIP:Content-Type header to message/cpim according to [RFC5438].

Table 17: MMS delivery report to CPM - CPM Delivery Notification details

SMTP/MM4_delivery_report.RES	Comment
MAIL From	Set by the MMS IWF to its own SMTP address.
RCPT To:	Set by the MMS IWF to the “Mail From” command parameter that was carried in the MM4_delivery_report.REQ.
DATA	The generated MM4_delivery_report.RES response (Table 19).

Table 18: MMS delivery report to CPM - SMTP transaction details

MM4 Information element	MM4 Parameter status	Comment
3GPP MMS Version	Mandatory	Set according to the MMS protocol version supported by the IWF.
Message Type	Mandatory	Set to “MM4_delivery_report.RES”.
Transaction ID	Mandatory	Set by the MMS IWF to the “Transaction ID” received in the MM4_delivery_report.REQ.
Message ID	Mandatory	Set by the MMS IWF to the “Message ID” received in the MM4_delivery_report.REQ.
Request Status	Mandatory	Set by the IWF to the appropriate value, as defined for X-Mms-Request-Statius-Code.
Originator-Recipient-Address	Optional	Set by the IWF, adding its own address (formatted as an MMS R/S address), after the one received in the MM4_delivery_report.REQ.
Return-Route	Optional	Set per the content of the Forward-Route received in the MM4_delivery_report.REQ.

Table 19: MMS delivery report to CPM - MM4_delivery_report.RES details

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6.3.1.1.4 MMS Read Reply to CPM Standalone Message Disposition Notification

When the IWF receives an MM4_read_reply_report.REQ, it SHALL perform the following:

1. It generates a SIP MESSAGE request with a delivery notification based on the received MM4_delivery_report.REQ and in accordance with [RFC3862] and [RFC5438], with the clarifications given in Table 20 below. The CPIM body per [RFC3862] carries a Disposition Notification XML document. The MIME type of the Disposition Notification XML document is "message/imdn+xml".

2. It sends the SIP MESSAGE request towards the CPM Client, according to the rules and procedures of the SIP/IP core.

3. It generates an MM4_read_reply_report.RES response in accordance with [3GPP TS23.140], with the clarifications given in Table 22 below.

4. It sends the MM4_delivery_report.RES in an SMTP transaction, with the clarifications given in Table 21 below.

CPM Delivery Notification SIP header, CPIM header and payload information elements **[headers from [RFC3261], [RFC3862], and [RFC5438] unless otherwise noted]**	**CPM Header status**	**MM4 Information element**	**Comment**
User-Agent	Mandatory		Set to the OMA CPM IWF release version of the IWF as specified in Appendix C "*Release Version in User-Agent and Server Headers*".
SIP header: P-Asserted-Identity [RFC3325] and/or From CPIM header: From	Mandatory	Recipient Address	NOTE: If a SIP URI is available, the IWF will include it in the From and P-Asserted-Identity headers. The IWF will translate the MSISDN into a TEL URI and insert it in the P-Asserted-Identity header. If a SIP URI is not available, the IWF will translate MSISDN into a TEL URI and insert it in the From and P-Asserted-Identity headers.
SIP headers: To, Request-URI CPIM header: To	Mandatory	Sender Address	Set the SIP headers To and Request-URI to "Sender Address" information element. NOTE: the IWF will use SIP URI if available, and otherwise translate MSISDN into TEL URI for the SIP header To, the Request-URI, and the CPIM header To. In the case the received CPM Standalone Message this IMDN relates to contained a "Referred-by" header, set the CPIM To header to the "Referred-By" header received in the corresponding CPM Standalone Message. Otherwise set the CPIM To to "Sender Address" information element.

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CPIM header : Content-Disposition XML body <display-notification> <status>	Mandatory	Read Status	Set the CPIM Content-Disposition header to ":notification". Set <display notification> <status> element of the XML body to the corresponding value of MM4_read_reply_report (X-Mms-Read-Status: "read" to <display-notification> <status> = displayed). X-Mms-Read-Status: "Deleted without being read" to <display-notification> <status> = error), where a CPM Client should understand that "error" means "deleted without being read".
CPIM header: IMDN-Route	Conditional		Set the CPIM IMDN-Route header according to IMDN-Record-Route header received in the CPM Standalone Message this IMDN relates to.
XML body: <original-recipient-uri>	Conditional		If the CPM Standalone Message recipient is a CPM Ad-hoc Group member, set <original-recipient-uri> element according to Original-To header (if present) received in the corresponding CPM Standalone Message.
CPIM header: Imdn.Message-ID	Mandatory		Set to a newly generated message id according to [RFC5438].
XML body: <recipient-uri>	Optional		Set according to [RFC5438] (i.e., set to CPIM To header received in the corresponding CPM Standalone Message).
XML body: <message-id>	Mandatory		Set to the value of the imdn.Message-ID header received in the corresponding CPM Standalone Message that triggered the read reply report.
SIP header: Date	Optional	Date and Time	Set the Date per the MM4 Date and Time.
XML body: <datetime>	Mandatory		Set the XML body: <datetime> to the CPIM DateTime received in the corresponding CPM Standalone Message.
SIP header: Call-ID	Mandatory		Set according to [RFC3261].
SIP header: CSeq	Mandatory		Set according to [RFC3261].
SIP header: Content-Type	Mandatory		Set the SIP Content-Type header to message/cpim according to [RFC5438].

Table 20: MMS read reply to CPM - CPM Delivery Notification details

SMTP/MM4_read-reply_report.RES	**Comment**
MAIL From	The MMS IWF sets to its own SMTP address.
RCPT To:	Set to the "Mail From" command parameter that was carried in the MM4_read_reply_report.REQ.
DATA	The generated MM4_read_reply_report.RES response (Table 22).

Table 21: MMS read reply to CPM - SMTP transaction details

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MM4 Information element	MM4 Parameter status	Comment
3GPP MMS Version	Mandatory	Set according to the MMS protocol version supported by the IWF.
Message Type	Mandatory	Set to “MM4_read_reply_report.RES”.
Transaction ID	Mandatory	Set to the “Transaction ID” received in the MM4_read_reply_report.REQ.
Message ID	Mandatory	Set to the “Message ID” received in the MM4_read_reply_report.REQ.
Request Status	Mandatory	Set to the appropriate value, as defined for X-Mms-Request-Status-Code.
Originator-Recipient-Address	Optional	The IWF adds its own address (formatted as an MMS R/S address), after the one received in the MM4_read_reply_report.REQ.
Return-Route	Optional	Set per the content of the Forward-Route received in the MM4_read_reply_report.REQ.

Table 22: MMS read reply to CPM – MM4_read_reply_report.RES details

6.3.1.1.5 CPM File Transfer to MMS Message

When the IWF receives a SIP INVITE request containing the CPM Feature Tag “3gpp-service.ims.icsi.oma.cpm.filetransfer” for a CPM File Transfer and if it is supposed to accept the CPM File Transfer on behalf of the MMS user based on service provider policy, it SHALL send a SIP 200 "OK" response if no errors are found in the SIP INVITE request or an appropriate error response otherwise.

When the IWF subsequently receives an MSRP SEND request, it SHALL perform the following:

1. It waits until all MSRP SEND request(s) for the CPM File Transfer have been received (based on the Byte-Range header in the MSRP SEND request(s)).
2. The IWF determines the address of the recipient’s MMS relay server in his home network.
3. The IWF generates in an MM4_forward.REQ message based on the received CPM File Transfer and in accordance with [3GPP TS23.140], with the clarifications given in Table 24 below.
4. The IWF sends theMM4_forward.REQ message to the recipient’s MMS relay server using an SMTP transaction, with the clarifications given in Table 23 below.
5. When an acknowledgement has been requested in the MM4_forward.REQ, the IWF keeps the transaction open to wait for the MM4_forward.RES.

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SMTP/MM4_forward.REQ	SIP INVITE header	Comment
MAIL From	P-Asserted-Identity [RFC3325], if present, otherwise, From	Interworked by the MMS IWF (to get an MMS useable format).
RCPT To:	Request-URI	Interworked by the MMS IWF.
DATA		The generated MM4_foward.REQ request (Table 24).

Table 23: CPM File Transfer to MMS - SMTP transaction details

MM4 Information element	MM4 Parameter status	CPM headers [headers from SIP INVITE [RFC3261] or MSRP [RFC4975] unless otherwise noted]	Comment
3GPP MMS Version	Mandatory		Set according to the MMS protocol version supported by the IWF.
Message Type	Mandatory		Set to “MM4_forward.REQ”.
Transaction ID	Mandatory		Unique transaction identifier assigned by the IWF.
Message ID	Mandatory	Conversation-ID and Contribution-ID	IWF assigned unique ID for the message, related to the Conversation-ID and the Contribution-ID
Recipient(s) address	Mandatory	Request-URI (when sent to one recipient or when sent to a CPM Pre-defined Group) URI list body carrying the “recipient-list-history” [RFC5366] (when sent to more than one recipient)	Interwork the recipient(s) address either from the value of the “Request-URI” header (in case of one recipient or when sent to a CPM Pre-defined group) or from the list of recipients in the “URI-List” in case of multiple recipients. The URIs with copyControl="to" are mapped to the MM4 Recipient(s) Address To: header (as defined in [STD11]). The URIs with copyControl="cc" are mapped to the MM4 Recipient(s) Address Cc: header (as defined in [STD11]). NOTE: it is expected that the MMS Client display CPM Addresses that it does not support but will not allow the user to send an MMS message to a CPM Address not supported by MMS (e.g., to a SIP URI).
Sender address	Mandatory	P-Asserted-Identity [RFC3325], if present, otherwise, From	NOTE: When the Privacy header is set to “id”, the From header might be set to an anonymous URI according to [RFC3323]. In this case the MMS client will route its delivery report and read reply report for the generated MMS on best effort.
Content type	Mandatory	Content-Type	

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Date and time	Mandatory	Date or CPIM header: DateTime [RFC5438]	Set the MMS date and time to, in order of preference: – CPIM header: DateTime if available, otherwise, – the Date of the SIP INVITE request if available, otherwise, – the current date and time at the IWF.
Sender visibility	Conditional	Privacy header [RFC3323] and [RFC3325]	Set if Privacy header value is present and set as per [RFC3323] and [RFC3325] (e.g., Privacy: id).
Acknowledgement Request	Optional		Set per the service provider policy.
Forward counter	Conditional		Set per the service provider policy.
Originator-System-Address	Optional		Set by the IWF to its own address, formatted as an MMS R/S address.
Forward-Route	Optional		Set by the IWF to its own address, formatted as an MMS R/S address.
Content	Conditional		Set per the payload received via MSRP.
Delivery report	Conditional	imdn.Disposition-Notification [RFC5438]	When the Disposition-Notification is set to at least one of the following values: – "positive-delivery" – "negative-delivery", – "interworking", then set the Delivery report to "Yes".
Read reply	Conditional	imdn.Disposition-Notification: display [RFC5438]	When the Disposition-Notification is set to "display", set the Read reply to "Yes".

Table 24: CPM File Transfer to MMS - MM4_forward.REQ details

6.3.1.1.6 CPM Session Interworking

6.3.1.1.6.1 CPM Session Invitation to MMS Message

When the MMS IWF receives a SIP INVITE request and if it is supposed to accept the session invitation on behalf of the MMS user based on service provider policy, the MMS IWF SHALL complete the SIP signalling on behalf of the MMS user as described in 6.1.5.1 *"CPM Session Media Handling"*.

When the MMS IWF receives a SIP INVITE request and if it is supposed to ask for the MMS user's response based on service provider policy, it SHALL perform the following:

1. It determines the address of the recipient's MMS relay server in his home network,
2. Then:

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a. For a CPM 1-1 Session, the MMS IWF SHALL either assign a new MSISDN to be used as the sender for all messages sent in relation to this session or use the TEL URI of the inviting CPM User as the MSISDN of the sender for this session. If a new MSISDN has been assigned, the identity of the inviting CPM User SHALL be included in the body of the MMS message.

b. For a CPM Group Session invitation, a new MSISDN SHALL be assigned to represent the group for the MMS user, and SHALL be used as the sender for all messages sent in relation to this session. In this case, the MMS user SHALL also receive the identity of the inviting CPM User as well as information about the group in the body of the MMS message.

3. It generates an MM4_forward.REQ request based on the received SIP INVITE request and in accordance with [3GPP TS23.140], with the clarifications given in Table 26.

4. It sends the MM4_forward.REQ request towards the recipient MMS user's MMS relay server in an SMTP transaction, with the clarifications given in Table 25 below.

5. When an acknowledgement has been requested in the MM4_forward.REQ, upon receipt of the MM4_forward.RES, if the IWF receives a negative response, the IWF SHALL respond with a SIP 4xx response to the CPM User in accordance with [RFC3261], with the clarifications given in Table 27.

When the MMS IWF receives an MM4_forward.REQ, it SHALL perform the following:

1. It SHALL check if the MM4_forward.REQ contains the MMS user response. If the received MM4_forward.REQ is not the MMS user response, the MMS IWF handles the message as if it is to be interworked to a CPM Standalone Message or CPM delivery notification based on the value of the received parameters. Otherwise continue with the rest of the steps.

NOTE: The MM4_foward.REQ contains the text indicating the response of the MMS user. The MMS IWF has to interpret the received text accordingly based on service provider policy.

2. SHALL generate a SIP response based on the MM4_forward.REQ and in accordance with [RFC3261], according to the received user response with the clarifications given in Table 27 below.

3. SHALL send the SIP response towards the ISF.

4. SHALL send an MM4_forward.RES response towards the MMS relay server.

After the MSRP session has been established, the payload from the CPM Client is delivered using MSRP SEND request(s) to the MMS IWF and it is handled as described in 6.3.1.1.6.2 "*CPM Chat Message to MMS Message*". The MMS messages received at the MMS IWF are handled as described in 6.3.1.1.6.5 "*MMS Originated Session Leaving request Handling*".

Upon receiving SIP BYE request, the MMS IWF SHALL respond with a SIP 200 "OK" and MAY send an MM4_forward.REQ towards the recipient MMS user's via their respective MMS relay server with appropriate text based on service provider policy to notify the MMS user that the CPM Group Session is being left or the CPM 1-1 Session is being closed as described in 6.3.1.1.6.4 "*CPM-Originated Session Leaving request*".

SMTP/MM4_forward.REQ	**CPM SIP INVITE header [headers from [RFC3261] unless otherwise noted]**	**Comment**
MAIL From		Set as described above in this section.
RCPT To:	Request-URI	Interworked by the MMS IWF.
DATA		The generated MM4_forward.REQ request (Table 26).

Table 25: CPM Session Invitation to MMS - SMTP transaction details

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MM4 Information element	MM4 Parameter status	CPM SIP INVITE header [headers from [RFC3261] unless otherwise noted]	Comment
3GPP MMS Version	Mandatory		Set according to the MMS protocol version supported by the IWF.
Message Type	Mandatory		Set to “MM4_forward.REQ”.
Transaction ID	Mandatory		Unique transaction identifier assigned by the IWF.
Message ID	Mandatory		IWF assigned unique ID for the message.
Recipient(s) address	Mandatory	Request-URI	Interworked by the MMS IWF using the value of the “Request-URI” header.
Sender address	Mandatory		Set as described above in this section.
Content type	Mandatory		Set according to the type of the Content which is defined according to service provider policy.
Date and time	Mandatory	Date	Set to Date provided in SIP INVITE request if present, otherwise set to current date and time at the IWF.
Time of Expiry	Conditional		Set according to service provider policy.
Delivery report	Conditional		Set to “No”.
Priority	Conditional	Priority	Set to corresponding value of the CPM Session invitation: – non-urgent= low – normal= medium – urgent= high.
Sender visibility	Conditional	Privacy header [RFC3323] and [RFC3325].	Set if Privacy header value is present and set as per [RFC3323] and [RFC3325] (e.g., Privacy: id).
Read reply	Conditional		Set to “No”.
Subject	Conditional	Subject	Set only if “Subject” header is set in CPM Session Invitation.
Acknowledgement Request	Optional		Set per service provider policy.
Forward counter	Conditional		Set per service provider policy.
Originator-System-Address	Optional		Set by the IWF to its own address, formatted as an MMS R/S address.
Forward-Route	Optional		Set by the IWF to its own address, formatted as an MMS R/S address.

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Content	Conditional	Referred-By, (when sent to one recipient or when sent to a CPM Pre-defined Group) URI list body carrying the “recipient-list-history” [RFC5365] (when sent to more than one recipient), and Body	If the Referred-By header is present, the SIP INVITE request was sent to a group, so the value of the Referred-By header containing the original sender of the SIP INVITE request is included as part of the Content. If the URI list body carrying the “recipient-list-history” is present then, per service provider policy, it MAY be included as part of the Content. If a new MSISDN has been assigned by the IWF, the Content is set as described in the first step 2 in section 6.3.1.1.6.1. If requested by service provider policy, service provider generated text indicating that the MMS User is invited to a session, information about the inviting user and the group (if any) and instructions on how to accept/reject or leave a session.

Table 26: CPM Session Invitation to MMS - MM4_forward.REQ details

Response to SIP INVITE	**CPM headers status**	**MM4_forward.REQ parameters**	**Comment**
Response code and phrase	Mandatory	Content of the MM4_forward.REQ	Set to SIP 200 "OK" if the recipient accepts the invitation. Otherwise, set to SIP 603 "Decline". NOTE: The keyword for session ‘accept’ or ‘reject’ in the replying text from the recipient is interpreted into the appropriate SIP response code by the IWF. The exact definition of the replying text is set as per service provider policy. But at least it needs to carry a keyword for either session ‘accept’ or ‘reject’.
Call-ID	Mandatory		Set to the received Call-ID in the SIP INVITE request.
To	Mandatory		Set to the received To header field in the SIP INVITE request based on [RFC3261].
Via	Mandatory		Set to the received Via header field in the SIP INVITE request.
From	Mandatory		Set to the received From header field in the SIP INVITE request.
CSeq	Mandatory		Set to the received CSeq header field in the SIP INVITE request.
Content-Length	Mandatory		Set to the length of the SDP body.
body	Conditional		If the response code is SIP 200 "OK", set as an SDP answer according to [RFC3264], [RFC4566] and [RFC4975]. Otherwise, there will not be an SDP body.

Table 27: CPM Session Invitation to MMS - MM4_forward.REQ details

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6.3.1.1.6.2 CPM Chat Message to MMS Message

NOTE 1: This section assumes that a CPM Session for the CPM Chat Message delivery has been established on behalf of the MMS user.

After the MSRP session has been established, the payload from the CPM Client is delivered using MSRP SEND request(s) to the MMS IWF. Any MMS message received within the scope of the CPM Session by the MMS IWF is handled as described in 6.3.1.1.6.5 "*MMS Originated Session Leaving request Handling*".

When the MMS IWF receives an MSRP SEND request, it performs the following:

1. SHALL wait until the entire CPM Chat Message is received according to the procedures as defined in [RFC4975] (if the CPM Chat Message is sent chunked using multiple MSRP SEND requests).
2. SHALL generate an MM4_forward.REQ request based on the received CPM Chat Message and in accordance with [3GPP TS23.140], with the clarification given in Table 29 below.
3. SHALL send the MM4_forward.REQ request in an SMTP transaction, with the clarifications given in Table 28 below.
4. If no error occurred, SHALL send MSRP 200 OK response according to [RFC4975]. Otherwise, the MMS IWF SHALL respond with an appropriate error response code according to [RFC4975].

SMTP/MM4_forward.REQ	**MSRP SEND request [headers from [RFC4975] unless otherwise noted]**	**Comment**
MAIL From		Set as described in the first step 2 in section 6.3.1.1.6.1.
RCPT To:		Interworked by the MMS IWF based on the corresponding SIP INVITE request.
DATA		The generated MM4_forward.REQ request (Table 29).

Table 28: CPM Chat Message to MMS - SMTP transaction details

MM4 Information element	**MM4 Parameter status**	**MSRP SEND request header [headers from [RFC4975] unless otherwise noted]**	**Comment**
3GPP MMS Version	Mandatory		Set according to the MMS protocol version supported by the IWF.
Message Type	Mandatory		Set to "MM4_forward.REQ".
Transaction ID	Mandatory		Unique transaction identifier assigned by the IWF.
Message ID	Mandatory		IWF assigned unique ID for the message.
Recipient(s) address	Mandatory		Interworked by the MMS IWF based on the corresponding SIP INVITE request.
Sender address	Mandatory		Set as described in the first step 2 in section 6.3.1.1.6.1.
Content type	Mandatory	Content-Type	Set according to the type of the Content which is defined according to service provider policy.

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Date and time	Mandatory	CPIM header: DateTime [RFC5438]	Set to CPIM header: DateTime if present, otherwise set to current date and time at the IWF.
Time of Expiry	Conditional		Set according to service provider policy.
Priority	Conditional		Set according to service provider policy.
Sender visibility	Conditional		Set if Privacy header value is present in the corresponding SIP INVITE request and set as per [RFC3323] and [RFC3325] (e.g., Privacy: id).
Forward counter	Conditional		Set per the service provider policy.
Originator-System-Address	Optional		Set by the IWF to its own address, formatted as an MMS R/S address.
Forward-Route	Optional		Set by the IWF to its own address, formatted as an MMS R/S address.
Content	Conditional	CPIM header: From [RFC3862] and Body	If the CPIM header From is present, its value (which contains the actual sender of the MSRP SEND request) is included as part of the Content. The Content is also set to corresponding body types received in the MSRP SEND request. If requested by service provider policy, service provider generated text indicating instructions on how to leave a session will be included. Additionally Participant Information may also be included according to service provider policy.
Delivery report	Conditional	imdn.Disposition-Notification [RFC5438]	When the Disposition-Notification is set to at least one of the following values: – "positive-delivery" – "negative-delivery", – "interworking", then set the Delivery report to "Yes".
Read reply	Conditional	imdn.Disposition-Notification: display [RFC5438]	When the Disposition-Notification is set to "display", set the Read reply to "Yes".

Table 29: CPM Chat Message to MMS - MM4_forward.REQ details

6.3.1.1.6.3 MMS Message to CPM Chat Message

NOTE: This section assumes that a CPM Session has been established with the IWF.

When the IWF receives an MM4_Forward.REQ message, it SHALL perform the following:

1. It generates one or more MSRP SEND requests (more than one if chunking is needed to transfer the MMS user's message) based on [RFC4975] with the following clarifications:
    a. SHALL set the content-type to Content-Type=message/cpim.

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b. MAY set Success-Report and/or Failure-Report headers based on service provider policy.

2. SHALL send one or more MSRP SEND requests towards the CPM Client, with the clarifications given in Table 30 below.

CPM MSRP SEND header [headers from [RFC4975] unless otherwise noted]	CPM MSRP SEND Parameter status	MM4 Information element	Comment
To-Path	Mandatory		Set by the IWF.
From-Path	Mandatory		Set by the IWF.
Message-ID			Set by the IWF.
Byte-Range			Set by the IWF per the byte chunk being sent.
Content Type			Set by the IWF.
Success-Report and Failure Report	Conditional	Delivery report	When the Delivery report is set to “Yes”, set the Success-Report and Failure-Report to “Yes”.
Imdn.DateTime	Optional	Date and time	Set to date provided in MM4_forward.REQ, otherwise set to current date and time at the IWF.
CPIM header: From		MAIL FROM: and Sender visibility	If Sender visibility is set to Hide the sender’s identity, set to an anonymous URI, see [RFC3323], otherwise interworked by the MMS IWF.
Body		Content	Set by the IWF, based on the Byte-Range.

Table 30: MMS to CPM Chat Message - MSRP SEND details

6.3.1.1.6.4 CPM-Originated Session Leaving request Handling

Upon receiving a SIP BYE request, the MMS IWF, based on service provider policy, MAY send an MM4_forward.REQ request towards the recipient MMS user’s MMS relay server with service provider determined text to notify the MMS user that the CPM Group Session is being left or the CPM 1-1 Session is being closed.

SMTP/MM4_forward.REQ	CPM SIP BYE header [headers from [RFC3261] unless otherwise noted]	Comment
MAIL From		Set as described in the first step 2 in section 6.3.1.1.6.1.
RCPT To:		Interworked by the MMS IWF.
DATA		The generated MM4_forward.REQ request (Table 32).

Table 31: CPM Session leaving request to MMS - SMTP transaction details

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MM4 Information element	MM4 Parameter status	CPM SIP BYE header [headers from [RFC3261] unless otherwise noted]	Comment
3GPP MMS Version	Mandatory		Set according to the MMS protocol version supported by the IWF.
Message Type	Mandatory		Set to “MM4_forward.REQ”
Transaction ID	Mandatory		Unique transaction identifier assigned by the IWF.
Message ID	Mandatory		IWF assigned unique ID for the message.
Recipient(s) address	Mandatory		Set to the same value used in Recipient(s) address in section 6.3.1.1.6.1.
Sender address	Mandatory		Set as described in the first step 2 in section 6.3.1.1.6.1.
Content type	Mandatory		Set according to the type of the Content which is defined according to service provider policy.
Date and time	Mandatory		Set to current date and time at the IWF.
Time of Expiry	Conditional		Set according to service provider policy.
Delivery report	Conditional		Set to “No”.
Priority	Conditional		Set according to service provider policy.
Sender visibility	Conditional		Set if Privacy header value is present in the corresponding SIP INVITE request and set as per [RFC3323] and [RFC3325] (e.g., Privacy: id).
Read reply	Conditional		Set to “No”.
Acknowledgement Request	Optional		Set per service provider policy.
Forward counter	Conditional		Set per service provider policy.
Originator-System-Address	Optional		Set by the IWF to its own address, formatted as an MMS R/S address.
Forward-Route	Optional		Set by the IWF to its own address, formatted as an MMS R/S address.
Content	Conditional	Body	Service provider generated text indicating that the CPM Group Session has been left or the CPM 1-1 Session has been closed.

Table 32: CPM Session leaving request to MMS - MM4_forward.REQ details

6.3.1.1.6.5 MMS Originated Session Leaving request Handling

Upon receiving an MM4_forward.REQ containing service provider defined text indicating the MMS user wants to leave the CPM Group Session or to close the CPM 1-1 Session, the MMS IWF SHALL send a SIP BYE request towards the CPM User or CPM Controlling Function according to [RFC3261] and [OMA-CPM-TS-Conv-Func].

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6.3.1.1.6.6 Sending Participant Information to MMS User

When a CPM Group Session has been established, the IWF subscribes to receive Participant Information as described in section 7.3.10.1 of [OMA-CPM-TS-Conv-Func].

When the IWF receives the information in a SIP NOTIFY request, it SHALL generate an MM4_forward.REQ request based on the received SIP NOTIFY request and in accordance with [3GPP TS23.140], with the clarifications given in Table 34 below, and then send the MM4_Forward.REQ message to the MMS user's MMS relay server in an SMTP transaction, with the clarifications given in Table 33 below. The frequency of sending this information to the MMS user is based on service provider policy.

SMTP/MM4_forward.REQ	**SIP NOTIFY request [headers from [RFC3265] unless otherwise noted]**	**Comment**
MAIL From		Set as described in the first step 2 in section 6.3.1.1.6.1.
RCPT To		Interworked by the MMS IWF based on the corresponding SIP INVITE request.
DATA		The generated MM4_forward.REQ request (Table 34).

Table 33: Participant Information to MMS - SMTP transaction details

MM4 Information element	**MM4 Parameter status**	**SIP NOTIFY request [headers from [RFC3265] unless otherwise noted]**	**Comment**
3GPP MMS Version	Mandatory		Set according to the MMS protocol version supported by the IWF.
Message Type	Mandatory		Set to "MM4_forward.REQ".
Transaction ID	Mandatory		Unique transaction identifier assigned by the IWF.
Message ID	Mandatory		IWF assigned unique ID for the message.
Recipient(s) address	Mandatory		Set by the IWF to the MSISDN of the MMS user participating in this session.
Sender address	Mandatory		Set as described in the first step 2b in section 6.3.1.1.6.1, i.e. set to the MSISDN assigned to represent the group for the MMS user.
Content type	Mandatory	Content-Type	Set according to the type of the Content which is defined according to service provider policy.
Date and time	Mandatory		Set to current date and time at the IWF.
Time of Expiry	Conditional		Set according to service provider policy.
Priority	Conditional		Set according to service provider policy.
Forward counter	Conditional		Set per the service provider policy.
Originator-System-Address	Optional		Set by the IWF to its own address, formatted as an MMS R/S address.

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Forward-Route	Optional		Set by the IWF to its own address, formatted as an MMS R/S address.
Content	Conditional	Body	Set according to the information received in the SIP NOTIFY request. The actual information used and formatted into a textual or multimedia message from the SIP NOTIFY request is according to service provider policy.

Table 34: Participant Information to MMS - MM4_forward.REQ details

6.3.1.1.7 Successful MMS Transmission

Upon a successful MMS transmission, the CPM Interworking Function SHALL provide the following information to the CPM Participating Function:

A) In the 200 "OK" SIP response to a SIP MESSAGE request for a Pager Mode CPM Standalone Message; or

B) In the 200 "OK" SIP response to a SIP BYE request for a Large Message CPM Standalone Message, or for a CPM File Transfer request;

the following SIP header fields defined in Appendix C of [OMA-CPM-TS-Conv-Func]:

1. The Message-Context SIP header field set to the value of:
    a. "multimedia-message", indicating that MMS delivery was used for that message;
2. The Message-Correlator set to the value of:
    a. the unique identifier of the MMS via the value of the MMS-Id header.

For CPM Sessions, the IWF SHALL send to the CPM Participating Function in:

I. the 200 "OK" SIP response to a SIP INVITE request for a CPM Session, the following SIP header field defined in Appendix C of [OMA-CPM-TS-Conv-Func]:
    a) SIP header field set to the value of: "multimedia-message", indicating that MMS delivery was used for that message.
    b) For CPM Group Sessions, it SHALL extract from the SIP INVITE request the IW-Number SIP header field containing the unique interworking number allocated for that CPM Group Session and SHALL include it in the 200 "OK" response to the CPM Participating Function.

6.3.1.2 Interworking from MMS to CPM

In general the handling of the MMS IWF for interworking MMS messages to CPM requests is as follows:

- When the MMS IWF receives an MM4_forward.REQ request [3GPP TS23.140] for an MMS message that can be interworked to a CPM Standalone Message with a size smaller than or equal to 1300 bytes, it SHALL handle the MM4_forward.REQ as described in section 6.3.1.2.1 *"MMS to Pager Mode CPM Standalone* Message*"*.
- When the MMS IWF receives an MM4_forward.REQ request [3GPP TS23.140] for an MMS message that needs to be interworked to a CPM Standalone Message with a size bigger than 1300 bytes, it SHALL handle the MM4_forward.REQ as described in section 6.3.1.2.2 *"MMS Message to a Large Message Mode CPM Standalone Message"*.
- When the MMS IWF receives a CPM Standalone Message disposition notification containing a delivery status that is associated with a previously interworked MMS Message, it SHALL handle the CPM Standalone Message disposition notification as described in section 6.3.1.2.3 *"CPM Delivery Notification to MMS MM4_delivery_report"*.
- When the MMS IWF receives a CPM Standalone Message disposition notification containing a display status that is associated with a previously interworked MMS Message, it SHALL handle the CPM Standalone Message disposition notification as described in section 6.3.1.2.4 *"CPM Read Report to MMS"*.

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- When the MMS IWF receives an MM4_forward.REQ request [3GPP TS23.140] for an MMS message that is sent within the scope of an existing CPM Session and the MMS message contents does not represent the service provider defined text indicating the MMS user wants to leave the session, it SHALL handle the MM4_forward.REQ as described in section 6.3.1.2.5 *"MMS Message to CPM Chat Message"*.
- When the MMS IWF receives and MM4_forward.REQ request [3GPP TS23.140] for an MMS message that is sent within the scope of an existing CPM Session and the MMS message contents represents the service provider defined text indicating the MMS user wants to leave the session, it SHALL handle the MM4_forward.REQ as described in section 6.3.1.1.6.5 "*MMS Originated Session Leaving request Handling*".

NOTE: The sender's MMS Relay/Server may send the same MM4_forward.REQ request to many recipients in a single SMTP transaction, each identified by its own RCPT To. The MMS IWF will have to generate individual CPM messages per RCPT To.

6.3.1.2.1 MMS to Pager Mode CPM Standalone Message

When the IWF receives an MM4_forward.REQ, it SHALL perform the following:

1. When the message is short (e.g., at most 1300 bytes) it generates a Pager Mode CPM Standalone Message based on the received MM4_forward.REQ request and in accordance of section 7.2.1 of [OMA-CPM-TS-Conv-Func], with the clarifications given in Table 35 and Table 36 below.
2. It sends the Pager Mode CPM Standalone Message towards the intended recipient CPM User, according to the rules and procedures of the SIP/IP core.
3. If it receives a SIP response, it generates an MM4_forward.RES response, based on the received SIP response and in accordance with [3GPP TS23.140], with the clarifications given in Table 38 below.
4. It sends the MM4_fowards.RES response to the MMS relay server that sent the MM4_forward.REQ, in an SMTP transaction, with the clarifications given in Table 37 below.

CPM SIP MESSAGE header [headers from [RFC3261] unless otherwise noted]	**SMTP/MM4_forward.REQ**	**Comment**
Request-URI and To	RCPT To:	Interworked by the MMS IWF to the corresponding TEL URI format for the MSISDN carried in the RCPT To:

Table 35: MMS to Pager Mode CPM Standalone Message - SMTP level

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CPM SIP MESSAGE header [headers from [RFC3428] or [RFC3261] unless otherwise noted]	CPM SIP MESSAGE Headers status	MM4 Information element	Comment
User-Agent	Mandatory		Set to the OMA CPM IWF release version of the IWF as specified in Appendix C "*Release Version in User-Agent and Server Headers*".
If there is more than one recipient, all recipients are added in the CPM Standalone Message body as part of a recipient-list-history body as per [RFC5365]	Optional	Recipient(s) address	Translated by the IWF to the corresponding routable CPM addresses. NOTE 1: the IWF will use SIP URI if available, and otherwise translate MSISDN into TEL URI NOTE 2: a proper mapping from the MMS Recipient(s) address fields (To, Cc, and Bcc) towards the corresponding fields in the SIP URI List [RFC5365] is to be made. NOTE 3: Recipient(s) address is not used if there is only one recipient. NOTE 4: The RCPT To: is used to set Request-URI and To: as per Table 35.
P-Asserted-Identity [RFC3325] and/or From	Mandatory	Sender address	In the case where the MMS sender requested anonymity the address is not revealed in the From and Privacy header is set accordingly (e.g., Privacy: id). The IWF SHALL include a Non-CPM Communication Service Identifier as defined in Appendix D with the value set to "MMS". NOTE: If a SIP URI is available, the IWF will include it in the From and P-Asserted-Identity headers. The IWF will translate the MSISDN into a TEL URI and insert it in the P-Asserted-Identity header. If a SIP URI is not available, the IWF will translate MSISDN into a TEL URI and insert it in the From and P-Asserted-Identity headers.
Date	Optional	Date and time	Set to date provided in MM4_forward.REQ, otherwise set to current date and time at the IWF.
Expires	Optional	Time of Expiry	If the value received in "Time of Expiry" exceeds the service provider policy, set to the service provider value; otherwise set to the received value in "Time of Expiry".
imdn.Disposition-Notification [RFC5438]	Conditional	Delivery report	When Delivery Report is requested, value of Disposition-Notification is set to "positive-delivery, negative-delivery".
Priority	Optional	Priority	Set to corresponding value of CPM Standalone Message (i.e., MMS X-Mms-Priority: Low = CPM "non-urgent"; Normal = "normal"; High = "urgent").

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Privacy header [RFC3323] and [RFC3325].	Conditional	Sender visibility	When Sender visibility is set to Hide, the From header SHALL contain an anonymous URI according to [RFC3323] and optionally an alias or "Anonymous" as the display name, and the Privacy header field values SHALL be set according to [RFC3323] and [RFC3325].
imdn.Disposition-Notification [RFC5438]	Optional	Read reply	If Read reply is requested, then Set imdn.Disposition-Notification = “display”.
Subject	Optional	Subject	Set only if “Subject” header is set in MMS message.
Max-Forwards	Mandatory		Set per service provider policy.
Body	Conditional	Content	Interwork the incoming MM4_forward.REQ Content to an [RCF3428] Body.
Via	Mandatory		Set to the SIP URI address of the IWF.
CSeq	Mandatory		Set by the IWF.
Call-ID	Mandatory		Set by the IWF.

Table 36: MMS to Pager Mode CPM Standalone Message - MM4_foward.REQ level

SMTP/MM4_forward.REQ	**CPM SIP MESSAGE header [headers from [RFC3428] unless otherwise noted]**	**Comment**
MAIL From		Set by the MMS IWF to its own SMTP address.
RCPT To:		Set by the MMS IWF to the “Mail From” command parameter that was carried in the MM4_forward.REQ.
DATA		The generated MM4_forward.RES response (Table 38).

Table 37: MMS to Pager Mode CPM Standalone Message - response SMTP transaction details

MM4 Information element	**MM4 Parameter status**	**CPM SIP MESSAGE header [headers from [RFC3261] unless otherwise noted]**	**Comment**
Request Status	Mandatory	response code, and reason phrase	Set the X-Mms-Request-Status-Code per the response code [RFC3261] value. e.g.: • For SIP 200 "OK" or SIP 202 "Accepted", set X-Mms-Request-Status-Code to "Ok" • For SIP 401 "Unauthorized" or SIP 503 "Service Unavailable", set X-Mms-Request-Status-Code to "Error-service-denied".
3GPP MMS Version	Mandatory		Set according to the MMS protocol version supported the IWF.

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Message Type	Mandatory		Set to “MM4_forward.RES”.
Transaction ID	Mandatory		Set to the “Transaction ID” received in the MM4_forward.REQ.
Message ID	Mandatory		Set to the “Message ID” received in the MM4_forward.REQ.
Return-Route	Optional		Set to the “Forward-Route” received in the MM4_forward.REQ.
Originator-Recipient-Address	Optional		Set by the IWF, adding its own address (formatted as an MMS R/S address), after the one received in the MM4_forward.REQ.

Table 38: MMS to Pager Mode CPM Standalone Message – MM4_forward.RES details

6.3.1.2.2 MMS Message to a Large Message Mode CPM Standalone Message

When the IWF receives an MM4_forward.REQ for a message larger than 1300 bytes, it SHALL perform the following:

1. It initiates a session towards the targeted CPM User (with the CPM Feature Tag “3gpp-service.ims.icsi.oma.cpm.largemsg”, see Appendix H of [OMA-CPM-TS-Conv-Func]) by generating a SIP INVITE request based on the received MM4_forward.REQ request in accordance of section 7.2.1.2 of [OMA-CPM-TS-Conv-Func], with the clarifications given in Table 39 and Table 40 below, and subsequently sending this SIP INVITE request towards the CPM User, according to the rules and procedures of the SIP/IP core.

2. Assuming that a SIP 200 "OK" response is received, the IWF subsequently sends as many MSRP SEND request as needed to transmit to the CPM system the content (e.g., payload) received in the MM4_forward.REQ request, with the clarifications given in Table 41.

3. Upon receipt of the final MSRP response, the IWF:

    a. Sends a SIP BYE request and the CPM Group Session has been left or the CPM 1-1 Session has been closed, and

    b. Sends the MM4_forward.RES.

NOTE: The sender’s MMS R/S may send the same DATA package to many recipients, each identified by its own RCPT To. The MMS IWF will have to generate individual one Large Message Mode CPM Standalone Message per RCPT To.

CPM SIP INVITE header [headers from [RFC3261] unless otherwise noted]	**SMTP command**	**Comment**
Request-URI and To	RCPT To:	Incoming MSISDN interworked by the MMS IWF to the CPM address of the CPM User and populate the Request-URI and To headers.

Table 39: MMS to Large Message Mode CPM Standalone Message – SIP INVITE, SMTP level

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CPM SIP INVITE header [headers from [RFC3261] unless otherwise noted]	CPM SIP INVITE Parameter status	MM4 Information element	Comment
User-Agent	Mandatory		Set to the OMA CPM IWF release version of the IWF as specified in Appendix C "*Release Version in User-Agent and Server Headers*".
If there is more than one recipient, all recipients are added in the CPM Standalone Message body as part of a recipient-list-history body as per [RFC5365]	Optional	Recipient(s) address	Translated by the IWF to the corresponding routable CPM addresses. NOTE 1: the IWF will use SIP URI if available, and otherwise translate MSISDN into TEL URI NOTE 2: a proper mapping from the MMS Recipient(s) address fields (To, Cc, and Bcc) towards the corresponding fields in the SIP URI List [RFC5365] is to be made. NOTE 3 Recipient(s) address is not used if there is only one recipient. NOTE 4: The RCPT To: is used to set Request-URI and To: as per Table 39.
P-Asserted-Identity [RFC3325] and/or From	Mandatory	Sender address	In the case where the MMS sender requested anonymity the address is not revealed in the From or P-Asserted-Identity, and Privacy header is set accordingly (e.g., Privacy: id). The IWF SHALL include a Non-CPM Communication Service Identifier as defined in Appendix D with the value set to "MMS". NOTE: If a SIP URI is available, the IWF will include it in the From and P-Asserted-Identity headers. The IWF will translate the MSISDN into a TEL URI and insert it in the P-Asserted-Identity header. If a SIP URI is not available, the IWF will translate MSISDN into a TEL URI and insert it in the From and P-Asserted-Identity headers.
Date	Optional	Date and time	Set to date provided in MM4_forward.REQ, otherwise set to current date and time at the IWF.
Message-Expires (see [OMA-CPM-TS-Conv-Func])	Conditional	Time of Expiry	May be set by service provider policy if Time of Expiry is not provided.
Priority	Optional	Priority	Set to corresponding value of CPM Standalone Message (i.e., MMS X-Mms-Priority: Low = CPM "non-urgent"; Normal = "normal"; High = "urgent").

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Privacy header [RFC3323] and [RFC3325].	Conditional	Sender visibility	When Sender visibility is set to Hide, the From header SHALL contain an anonymous URI according to [RFC3323] and optionally an alias or "Anonymous" as the display name, and the Privacy header field values SHALL be set according to [RFC3323] and [RFC3325].
Subject	Optional	Subject	Set only if “Subject” header is set in MMS message.
Max-Forwards	Mandatory		Set per the service provider policy.
Accept-Contact	Mandatory		Set by the IWF including the CPM Feature Tag “3gpp-service.ims.icsi.oma.cpm.largemsg” according to [RFC3841] and Appendix H of [OMA-CPM-TS-Conv-Func]).
Via	Mandatory		Set to the address of the IWF.
CSeq	Mandatory		Set by the IWF.
Call-ID	Mandatory		Set by the IWF.

Table 40: MMS to Large Message Mode CPM Standalone Message - SIP INVITE, MM4_forward.REQ level

CPM MSRP SEND header [headers from [RFC4975] unless otherwise noted]	CPM MSRP SEND Parameter status	MM4 Information element	Comment
To-Path	Mandatory		Set by the IWF.
From-Path	Mandatory		Set by the IWF.
Message-ID			Set by the IWF.
Byte-Range			Set by the IWF per the byte chunk being sent.
Content Type			Set by the IWF.
Imdn.Disposition-Notification [RFC5438]	Conditional	Delivery report	When the Delivery report is set to “Yes”, set the Disposition-Notification to “positive-delivery” and “negative-delivery”.
Body		Content	Set by the IWF, function of the Byte-Range.

Table 41: MMS to Large Message Mode CPM Standalone Message - MSRP SEND details

6.3.1.2.3 CPM Delivery Notification to MMS MM4_delivery_report

When the IWF receives a CPM delivery notification:

1. It SHALL generate an MM4_delivery_report.REQ request based on the received CPM delivery notification and in accordance with [3GPP TS23.140], with the clarifications given in Table 43 below.
2. It SHALL send the MM4_delivery_report.REQ request in an SMTP transaction, with the clarifications given in Table 42 below.
3. It SHALL respond with a SIP 200 "OK", per [RFC3261].

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SMTP command	CPM SIP MESSAGE header	Comment
MAIL From		Set by the MMS IWF to its own SMTP address.
RCPT To:	Request-URI	Interworked by the MMS IWF.
DATA		The MM4_delivery_report.REQ request (Table 43).

Table 42: CPM Delivery Notification to MMS - SMTP transaction details

MM4 Information element	MM4 Parameter status	CPM Delivery Notification header [headers from [RFC5438] unless otherwise noted]	Comment
3GPP MMS Version	Mandatory		Set according to the MMS protocol version supported by either the MM4 relay server or the IWF.
Message Type	Mandatory		Set to "MM4_delivery_report.REQ".
Transaction ID	Mandatory		Unique transaction identifier generated by the IWF.
Message ID	Mandatory		This is the Message ID of the original MMS.
Recipient Address	Mandatory	To	Set to the "To" header.
Sender Address	Mandatory	P-Asserted-Identity [RFC3325], if present, otherwise, From	NOTE: The use case of a CPM Client anonymizing its identity while generating a delivery notification is questionable and hence not supported here.
Date and time	Mandatory	Date	Set the MMS date and time to, in order of preference: – the Date of the CPM Delivery Notification if available, otherwise, – the current date and time at the IWF.
Acknowledgement Request	Optional		Set according to service provider policy.
MM Status	Mandatory	Content-Disposition : notification Body: delivery-notification	Set to corresponding value of MM4_delivery_report (i.e., X-Mms-MM-Status-Code): delivered = Retrieved, failed = Rejected, _forbidden = Rejected, error = Indeterminate). NOTE: The IWF should silently discard incoming processing-notification information received from CPM.
Forward-Route	Optional		Set by the IWF to its own address, formatted as an MMS R/S address.

Table 43: CPM Delivery Notification to MMS - MM4_delivery_report.REQ details

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6.3.1.2.4 CPM Read Report to MMS MM4 Read Reply

When the IWF receives a CPM disposition notification with status displayed:

1. It SHALL generate an MM4_read_reply_report.REQ request based on the received CPM disposition notification and in accordance with [3GPP TS23.140], with the clarifications given in Table 45 below.

2. It SHALL send the MM4_read_reply.REQ request in an SMTP transaction, with the clarifications given in Table 44 below.

NOTE: If the original MMS sender asked for anonymity, the IWF will make a best effort to send him the related read reply report.

3. It SHALL generate an MM4_delivery_report.REQ request based on the received CPM delivery notification and in accordance with [3GPP TS23.140], with the clarifications given in Table 43 below.

4. It SHALL respond with a SIP 200 "OK", per [RFC3261].

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SMTP command	CPM SIP MESSAGE header	Comment
MAIL From		Set by the MMS IWF to its own SMTP address.
RCPT To:	Request-URI	Interworked by the MMS IWF.
DATA		The generated MM4_read_reply.REQ request (Table 45).

Table 44: CPM Read Report to MMS - SMTP transaction details

MM4 Information element	MM4 Parameter status	CPM Delivery Notification header [headers from [RFC5438] unless otherwise noted]	Comment
3GPP MMS Version	Mandatory		Set according to the MMS protocol version supported by either the MM4 relay server or the IWF.
Message Type	Mandatory		Set to "MM4_read_reply_report.REQ".
Transaction ID	Mandatory		Unique transaction identifier generated by the IWF.
Message ID	Mandatory	Conversation-ID and Contribution-ID	IWF assigned unique ID for the message, related to the Conversation-ID and the Contribution-ID.
Recipient Address	Mandatory	To	Set to the "To" header.
Sender Address	Mandatory	P-Asserted-Identity [RFC3325], if present, otherwise, From	NOTE: The use case of a CPM Client anonymizing its identity while generating a delivery notification is questionable and hence not supported here.
Date and time	Mandatory	Date	Set the MMS date and time to, in order of preference: – the Date of the CPM Delivery Notification if available, otherwise, – the current date and time at the IWF.
Acknowledgement Request	Optional		Set according to service provider policy.
Read Status	Mandatory	Content-Disposition : notification Body: display-notification	Set to X-Mms-Read-Status to the corresponding value of Content-Disposition (i.e., displayed = Read). NOTE: The IWF should silently discard incoming processing-notification information received from CPM.
Forward-Route	Optional		Set by the IWF to its own address, formatted as an MMS R/S address.

Table 45: CPM Read Report to MMS - MM4_read_reply_report.REQ details

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6.3.1.2.5 MMS Message to CPM Chat Message

NOTE: This section assumes that a CPM Session has been established with the IWF.

When the IWF receives an MM4_Forward.REQ message, it SHALL perform the following:

1. It generates one or more MSRP SEND requests (more than one if chunking is needed to transfer the MMS user's message) based on [RFC4975] with the following clarifications:
   a. SHALL set the content-type as Content-Type=message/cpim.

   b. MAY set Success-Report and/or Failure-Report headers based on the service provider.

2. SHALL send one or more MSRP SEND requests towards the CPM Client, with the clarifications given in Table 46 below.

CPM MSRP SEND header [headers from [RFC4975] unless otherwise noted]	CPM MSRP SEND Parameter status	MM4 Information element	Comment
To-Path	Mandatory		Set by the IWF.
From-Path	Mandatory		Set by the IWF.
Message-ID			Set by the IWF.
Byte-Range			Set by the IWF per the byte chunk being sent.
Content Type			Set by the IWF.
Success-Report and Failure Report	Conditional	Delivery report	When the Delivery report is set to "Yes", set the Success-Report and Failure-Report to "yes".
Imdn.DateTime	Optional	Date and time	Set to date provided in MM4_forward.REQ, otherwise set to current date and time at the IWF.
CPIM header: From		MAIL FROM: and Sender visibility	If Sender visibility is set to Hide the sender's identity, set to an anonymous URI, see [RFC3323], otherwise interworked by the MMS IWF.
Body		Content	Set by the IWF, based on the Byte-Range.

Table 46: MMS to CPM Chat Message - MSRP SEND details

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6.4 Interworking with E-mail

When interworking messages between CPM and e-mail, with respect to handling SMIL content, since CPM is compatible with [3GPP26.141]:

- When interworking from CPM to e-mail, the e-mail IWF receiving a message (that either uses SMIL for media synchronization and scene description, or not) SHALL provide it to the e-mail system unmodified.
- When interworking from e-mail to CPM, the e-mail IWF receiving an e-mail (that either uses SMIL for media synchronization and scene description, or not) SHALL provide it to CPM unmodified.

The e-mail IWF is acting as an SMTP MTA node according to [RFC5321].

NOTE 1: The IWF should not be used as a relaying MTA.

Figure 3 shows the architecture and protocols used for interworking between CPM and e-mail.

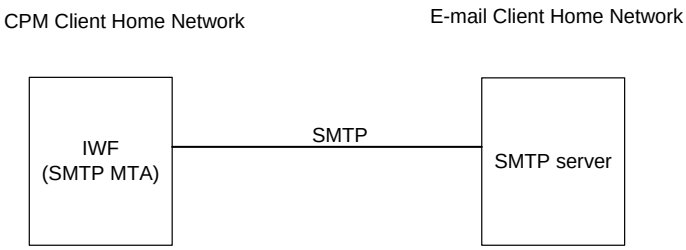

Figure 3 CPM to e-mail interworking architecture

The e-mail IWF SHALL support the commands and replies specified in SMTP [RFC5321].

NOTE 2: The tables in the following sections contain a description of the parameters that are necessary for CPM to/from e-mail interworking. Not all of the CPM or e-mail related parameters are needed for interworking.

NOTE 3: Interworking may occur in either the originating or terminating network as defined in [OMA-CPM-TS-Conv-Func].

6.4.1 E-mail address handling in CPM

Upon or before the first interworking with e-mail, the CPM entity (e.g., CPM User, CPM Group Session identity) SHALL be assigned an e-mail address corresponding to the SIP URI of the CPM entity according to service provider policy.

The corresponding IWF SHALL keep a pre-established mapping between CPM Address and corresponding e-mail address for each CPM entity that was assigned an e-mail address already.

When it is determined to send a CPM Standalone Message (or CPM File Transfer or CPM Session related requests) as an e-mail message, the IWF:

- SHALL use the originating CPM User's corresponding e-mail address assigned as described above in MAIL FROM command of SMTP [RFC5321];
- SHALL use the target address carried in Request-URI in RCPT TO command of SMTP [RFC5321].

NOTE: mailto URI can be inserted as Request-URI a) directly by the CPM originator or b) by the ISF (applicable only if interworking is performed in the terminating network).

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When an incoming e-mail message is interworked to CPM:

- the recipient CPM entity's e-mail address assigned as described above is received in the RCPT TO command of SMTP [RFC5321] and is used by the IWF to retrieve the corresponding CPM User address which then is used to populate the To and Request-URI fields of [RFC3261].

6.4.2 Interworking from CPM to E-mail

When the e-mail IWF receives a CPM request that is to be sent to an e-mail user, it SHALL determine the address of the recipient's SMTP server, (e.g., via DNS query).

In general the handling of the e-mail IWF for interworking CPM requests to e-mail messages is as follows:

- When the e-mail IWF receives a Pager Mode CPM Standalone Message (i.e., a SIP MESSAGE request containing the CPM Feature Tag "3gpp-service.ims.icsi.oma.cpm.msg") it SHALL handle the Pager Mode CPM Standalone Message as described in section 6.4.2.1 "*Pager Mode CPM Standalone Message to e-mail message*".
- When the e-mail IWF receives a Large Message Mode CPM Standalone Message (i.e., a SIP INVITE request containing the CPM Feature Tag "3gpp-service.ims.icsi.oma.cpm.largemsg"), it SHALL handle the Large Message Mode CPM Standalone Message as described in section 6.4.2.2 "*Large Message Mode CPM Standalone Message to e-mail message*".
- When the e-mail IWF receives a CPM File Transfer (i.e., a SIP INVITE request containing the CPM Feature Tag "3gpp-service.ims.icsi.oma.cpm.filetransfer"), it SHALL handle the CPM File Transfer as described in section 6.4.2.3 "*CPM File Transfer to e-mail message*".
- When the e-mail IWF receives a CPM Session Invitation (i.e., a SIP INVITE request containing the CPM Feature Tag "3gpp-service.ims.icsi.oma.cpm.session"), it SHALL handle the CPM Session Invitation as described in section 6.4.2.4 "*CPM Session Invitation to e-mail Message*".
- When the e-mail IWF receives a CPM Chat Message inside a CPM Session, it SHALL handle the CPM Chat Message as described in section 6.4.2.4.1 "*CPM Chat Message to e-mail Message*".
- When the e-mail IWF receives a CPM Session Leaving request inside a CPM Session, it SHALL handle the CPM Chat Message as described in section 6.4.2.4.2 "*CPM Session Leaving request to e-mail Message*".
- Interworking Participant Information on CPM Sessions is described in section 6.4.2.4.3 "*Sending Participant Information to e-mail user*".

6.4.2.1 Pager Mode CPM Standalone Message to e-mail message

When the IWF receives a Pager Mode CPM Standalone Message, carried as a SIP MESSAGE request, it SHALL perform the following:

1. It initiates a DNS query to find the address of the recipient's SMTP server.
2. It generates an e-mail message based on the received Pager Mode CPM Standalone Message in accordance with [RFC5322], with the clarifications given in Table 48 below.
3. It sends the e-mail message to the recipient's SMTP server as specified in [RFC5321] with the clarifications given in Table 47 below.
4. If it receives an SMTP response, it generates and sends a SIP response based on the received SMTP response and in accordance with [RFC3261], with the clarifications given in Table 49.

NOTE: How to correlate e-mail disposition notification with corresponding CPM Standalone Message IMDN is implementation specific.

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SMTP Commands [RFC5321]	CPM SIP MESSAGE header	Comment
MAIL FROM		Set by the e-mail IWF to the originating CPM User's corresponding e-mail address as described in section 6.4.1.
RCPT TO	Request-URI	Interwork to mailto URI carried in Request-URI as described in section 6.4.1.
BY (i.e., parameter of extended MAIL FROM command of Deliver By SMTP Service Extension [RFC2852])	Expires	Set BY parameter of extended MAIL FROM command according to received value in Expires according to rules and procedures of [RFC2852] and service provider policy.
DATA		The generated e-mail message (Table 48).

Table 47: Pager Mode CPM Standalone Message to e-mail message - SMTP transaction details

Internet Message Format [RFC5322] header and body	Internet Message Format parameter status	CPM SIP MESSAGE header [headers from [RFC3428] unless otherwise noted]	Comment
From	Mandatory	P-Asserted-Identity [RFC3325], if present, otherwise, From. Privacy header [RFC3323] and [RFC3325]	When the message is sent to one recipient, the P-Asserted-Identity or the From header is used to find the corresponding e-mail From header, as described in section 6.4.1. When the message is sent to a CPM Group, then the [RFC5322] From header field is set to an e-mail address corresponding to the CPM Group address carried in P-Asserted-Identity or From header. When the Privacy is set to "id", the From header SHALL contain an anonymous URI according to [RFC3323] and optionally an alias or "Anonymous" as the display name.
Date	Mandatory	Date or CPIM header: DateTime [RFC5438]	Set the e-mail Date to, in order of preference: – the CPIM header: DateTime if available, otherwise – the Date of the SIP MESSAGE request if available, otherwise, – the current date and time at the IWF.

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To, Cc	Optional	Request-URI (when sent to one recipient or when sent to a CPM Pre-defined Group) URI list body carrying the “recipient-list-history” [RFC5366] (when sent to more than one recipient)	In case of one recipient or when sent to a CPM Pre-defined group, interwork to mailto URI carried in Request-URI as described in section 6.4.1. In case of multiple recipients, set to the list of recipients in the “URI-List. The URIs with copyControl="to" are mapped to the e-mail [RFC5322] destination address “To:” header field. The URIs with copyControl="cc" are mapped to the e-mail [RFC5322] destination address “Cc:” header field. NOTE: The incoming copyControl=”bcc” is stripped off by the CPM Controlling Function before reaching the Interworking Function.
msg-id, In-Reply-To and References.	Optional	Conversation-ID, Contribution-ID, and ReplyTo-Contribution-ID	Identities for the message, related to the Conversation-ID, the Contribution-ID and the ReplyTo-Contribution-ID. NOTE: See Appendix E (informative).
Sender	Optional		When the message is sent to CPM Group, then the Sender header field is set to an e-mail address corresponding to message originator’s address carried in Referred-By header.
Reply-To	Optional	Reply-To	If SIP Reply-To header is available, SIP Reply-To header is interworked to e-mail Reply-To header.
Subject	Optional	Subject	Set only if “Subject” header is set in Pager Mode CPM Standalone Message.
X-Priority [MAILEXT]	Optional	Priority	Set to corresponding value of Priority (i.e., 5 = CPM "non-urgent"; 3 = "normal"; 1 = "urgent").
Disposition-Notification-To and disposition-type [RFC3798]	Conditional	imdn.Disposition-Notification [RFC5438]	When [RFC5438] “imdn.Disposition-Notification” is set to “positive-delivery” or “negative-delivery” or both. Set "Disposition-Notification-To is "required" according to [RFC3798]. When [RFC5438] “imdn.Disposition-Notification” is set to "display", set "disposition-type" to "displayed" according to [RFC3798].
Message body	Optional	MIME body	Interwork the incoming [RFC3428] MIME body to an [RFC5322] Message body.

Table 48: Pager Mode CPM Standalone Message to e-mail message – e-mail message details

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CPM SIP MESSAGE response header [headers from [RFC3428] unless otherwise noted]	CPM parameter status	SMTP [RFC5321] Reply header	Comment
Response code [RFC3261] Reason phrase [RFC3261]	Mandatory	SMTP response	Set the response code and reason phrase of the SIP response as follows: SIP 202 “Accepted” sent when SMTP response is “250 OK” SIP 4xx or 5xx with the corresponding reason phrase is sent when SMTP response is Transient Negative Completion reply (4yz) or Permanent Negative Completion reply (5yz)).
Call-ID	Mandatory		Set by the e-mail IWF per the Call-ID header field received in the Pager Mode CPM Standalone Message.
To	Mandatory		Set by the e-mail IWF, per the To header field received in the Pager Mode CPM Standalone Message.
Via	Mandatory		Set by the e-mail IWF, per the Via header field received in the Pager Mode CPM Standalone Message.
From	Mandatory		Set by the e-mail IWF, per the From header field received in the Pager Mode CPM Standalone Message.
CSeq	Mandatory		Set by the e-mail IWF, per the CSeq header field received in the Pager Mode CPM Standalone Message.
Content-Length	Mandatory		Set to 0 by the e-mail IWF.

Table 49: Pager Mode CPM Standalone Message to e-mail message - SIP response details

6.4.2.2 Large Message Mode CPM Standalone Message to e-mail message

When the IWF receives a SIP INVITE request for a Large Message Mode CPM Standalone Message, it SHALL send a SIP 200 "OK" response if no errors are found in the SIP INVITE request or an appropriate error response otherwise.

When the IWF subsequently receives an MSRP SEND request, it SHALL perform the following:

1. It waits until all MSRP SEND request(s) for the Large Message Mode CPM Standalone Message have been received (based on the Byte-Range header in the MSRP SEND request(s)),
2. The IWF initiates a DNS query to find the address of the recipient’s SMTP server.
3. The IWF generates an e-mail message based on the received Large Message Mode CPM Standalone Message and in accordance with [RFC5322], with the clarifications given in Table 51 below.

It sends the e-mail message to the recipient’s SMTP server as specified in [RFC5321] with the clarifications given in Table 50 below.

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SMTP Commands [RFC5321]	CPM SIP INVITE header	Comment
MAIL FROM		Set by the e-mail IWF to the originating CPM User's corresponding e-mail address as described in section 6.4.1.
RCPT TO	Request-URI	Interwork to mailto URI carried in Request-URI as described in section 6.4.1.
BY (i.e., parameter of extended MAIL FROM command of Deliver By SMTP Service Extension [RFC2852])	Message-Expires [OMA-CPM-TS-Conv-Func]	Set BY parameter of extended MAIL FROM command according to received value in Message-Expires according to rules and procedures of [RFC2852] and service provider policy.
DATA		The generated e-mail message (Table 51).

Table 50: Large Message Mode CPM Standalone Message to e-mail message - SMTP details

Internet Message Format [RFC5322] header	Internet Message Format Parameter status	CPM headers [headers from SIP INVITE [RFC3261] or MSRP [RFC4975] unless otherwise noted]	Comment
From	Mandatory	P-Asserted-Identity [RFC3325], if present, otherwise, From. Privacy header [RFC3323] and [RFC3325].	When the message is sent to one recipient, the P-Asserted-Identity or the From header is used to find the corresponding e-mail From header as described in section 6.4.1. When the message is sent to a CPM Group, then the [RFC5322] From header field is set to an e-mail address corresponding to the CPM Group address carried in P-Asserted-Identity or From header. When the Privacy is set to "id", the From header SHALL contain an anonymous URI according to [RFC3323] and optionally an alias or "Anonymous" as the display name.
Reply-To	Optional	Reply-To	If SIP Reply-To header is available, SIP Reply-To header is interworked to e-mail Reply-To header.
Sender	Conditional		When the message is sent to a CPM Group, then the Sender header field is set to an e-mail address corresponding to message originator's address carried in Referred-By header.
Date	Mandatory	Date or CPIM header: DateTime [RFC5438]	Set the e-mail Date to, in order of preference: – CPIM header: DateTime if available, otherwise, – the Date of the SIP INVITE request if available, otherwise, – the current date and time at the IWF.

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To, Cc	Mandatory	Request-URI (when sent to one recipient or when sent to a CPM Pre-defined Group) URI list body carrying the “recipient-list-history” [RFC5366] (when sent to more than one recipient)	In case of one recipient or when sent to a CPM Pre-defined group, interwork to mailto URI carried in Request-URI as described in section 6.4.1. In case of multiple recipients, set to the list of recipients in the URI-List. The URIs with copyControl="to" are mapped to the e-mail [RFC5322] destination address “To:” header field. The URIs with copyControl="cc" are mapped to the e-mail [RFC5322] destination address “Cc:” header field. NOTE: The incoming copyControl=”bcc” is stripped off by the CPM Controlling Function before reaching the Interworking Function.
msg-id, In-Reply-To and References.	Optional	Conversation-ID, Contribution-ID and InReplyTo-Contribution-ID	Identities for the request, related to the Conversation-ID, the Contribution-ID and the ReplyTo-Contribution-ID. NOTE: See Appendix E (informative).
Subject	Optional	Subject	Set only if “Subject” header is available.
X-Priority [MAILEXT]	Optional	Priority	Set to corresponding value of Priority (i.e., 5 = CPM "non-urgent"; 3 = "normal"; 1 = "urgent").
Disposition-Notification-To [RFC3798]	Conditional	imdn.Disposition-Notification [RFC5438]	When the Disposition-Notification is set to “positive-delivery” or “negative-delivery”, set the Disposition-Notification-To.
Message body	Optional		Set per the payload received via MSRP.

Table 51: Large Message Mode CPM Standalone Message to e-mail message – e-mail message details

6.4.2.3 CPM File Transfer to e-mail message

When the IWF receives a SIP INVITE request containing the CPM Feature Tag “3gpp-service.ims.icsi.oma.cpm.filetransfer” for a CPM File Transfer and if it is supposed to accept the CPM File Transfer on behalf of the e-mail user based on service provider policy, it SHALL send a SIP 200 "OK" response if no errors are found in the SIP INVITE request or an appropriate error response otherwise.

When the IWF subsequently receives an MSRP SEND request, it SHALL perform the following:

1. It waits until all MSRP SEND request(s) for the CPM File Transfer have been received (based on the Byte-Range header in the MSRP SEND request(s)).
2. The IWF initiates a DNS query to find the address of the recipient’s SMTP server.
3. The IWF generates an e-mail message based on the received CPM File Transfer and in accordance with [RFC5322], with the clarifications given in Table 53 below.
4. It sends the e-mail message to the recipient’s SMTP server as specified in [RFC5321] with the clarifications given in Table 52 below.

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SMTP Commands [RFC5321]	SIP INVITE header	Comment
MAIL FROM		Set by the e-mail IWF to the originating CPM User's corresponding e-mail address as described in section 6.4.1.
RCPT TO	Request-URI	Interwork to mailto URI carried in Request-URI as described in section 6.4.1.

Table 52: CPM File Transfer to e-mail message - SMTP details

Internet Message Format [RFC5322] header	Internet Message Format Parameter status	CPM headers [headers from SIP INVITE [RFC3261] or MSRP [RFC4975] unless otherwise noted]	Comment
From	Mandatory	P-Asserted-Identity [RFC3325], if present, otherwise, From. Privacy header [RFC3323] and [RFC3325]	The P-Asserted-Identity or the From header is used to find the corresponding e-mail From header as described in section 6.4.1. When the Privacy is set to "id", the From header SHALL contain an anonymous URI according to [RFC3323] and optionally an alias or "Anonymous" as the display name.
Date	Mandatory	Date or CPIM header: DateTime [RFC5438]	Set the e-mail orig-date to, in order of preference: – CPIM header: DateTime if available, otherwise, – the Date of the SIP INVITE request if available, otherwise, – the current date and time at the IWF.
To	Mandatory	Request-URI	Interwork to mailto URI carried in Request-URI as described in section 6.4.1.
msg-id, In-Reply-To and References.	Optional	Conversation-ID, Contribution-ID and InReplyTo-Contribution-ID	Identities for the request, related to the Conversation-ID, the Contribution-ID and the ReplyTo-Contribution-ID. NOTE: See Appendix E (informative).
Content type	Mandatory	Content-Type	
Content disposition	Optional		Set to 'attachment' with the filename(s) as parameter.
Message body	Optional		Set per the payload received via MSRP.

Table 53: CPM File Transfer to e-mail parameter - e-mail message details

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6.4.2.4 CPM Session Invitation to e-mail Message

When the e-mail IWF receives a SIP INVITE request containing the CPM Feature Tag "3gpp-service.ims.icsi.oma.cpm.session" for a CPM Session and if it is supposed to accept the session invitation on behalf of the e-mail user based on service provider policy, the e-mail IWF SHALL complete the SIP signalling on behalf of the e-mail user as described in 6.1.4 "*CPM Session Invitation Handling*".

When the e-mail IWF receives a SIP INVITE request containing the CPM Feature Tag "3gpp-service.ims.icsi.oma.cpm.session" for a CPM Session and if it is supposed to ask for the e-mail user's response based on service provider policy, it SHALL perform the following:

1. The e-mail IWF determines the address of the recipient's SMTP server,
2. Address handling:
    a. For a CPM 1-1 Session, the e-mail IWF SHALL interwork the originating CPM User's CPM Address to an e-mail address as described in section 6.4.1 as the sender address for all messages sent in relation to this session.
    b. For a CPM Group Session invitation, a new e-mail address SHALL be assigned to represent the group to the e-mail user, and SHALL be used as the sender for all messages sent in relation to this session. In this case, the e-mail user SHALL also receive the identity of the inviting CPM User as well as information about the group in the header of the e-mail message.
3. The e-mail IWF establishes a two-way transmission channel to the SMTP server as specified in [RFC5321] and Table 54 by mapping the relevant headers from the CPM Session to the SMTP command.
4. When the target SMTP server (serving the e-mail user) rejects the SMTP session initiation request (i.e., e-mail IWF receives a 554 SMTP response), the e-mail IWF SHALL respond with a SIP 4xx response to the CPM User as per Table 56.
5. The e-mail IWF builds an e-mail message (i.e., e-mail notification for session invitation to ask for e-mail user response) as specified in [RFC5322] and Table 55 by mapping the relevant headers and body from the CPM SIP INVITE request to the e-mail message. It initiates an e-mail transaction to send the message to the recipient.

    NOTE: The e-mail message includes service provider generated text indicating that the e-mail user is invited to a session, and instructions on how to accept/reject or leave a session.
6. If it receives an SMTP response, it composes a SIP response as described in Table 56 and sends the SIP response to the CPM User with the following clarifications:
    a. When the e-mail IWF receives an SMTP 250 "OK" response, the IWF generates a SIP 200 "OK" response and sends it along the signalling path. On the reception ofthe SIP 200 "OK" response, the corresponding CPM entity is required to establish an MSRP connection with the e-mail IWF to deliver chat messages.
    b. When the e-mail IWF receives a negative SMTP response (i.e., Transient Negative Completion reply (4yz) or Permanent Negative Completion reply (5yz)), the e-mail IWF generates a SIP 488 "Not Acceptable Here" response and sends it along the signaling path.

When the e-mail IWF receives an e-mail message, the e-mail IWF:

1. SHALL check if the e-mail message contains the e-mail user's response by interpreting the text indicating the response of the e-mail user. The e-mail IWF has to interpret the received text accordingly based on service provider policy, and,
2. If the e-mail message contains the response of the e-mail user, the e-mail IWF SHALL interpret the response as defined in Table 56. If the e-mail user accepts the invitation, the e-mail IWF SHALL establish an MSRP connection with the corresponding CPM entity, according to the MSRP connection parameters in the SDP offer received in the SIP INVITE request according to [RFC6135] and [RFC6714] to deliver e-mail messages to the CPM User in chat mode. If the e-mail user declines the session invitation, the e-mail IWF SHALL leave the CPM Session.

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When the e-mail IWF receives a CPM Chat Message via MSRP SEND request(s) from the CPM Client, the e-mail IWF delivers the message to the e-mail user and it is handled as described in 6.4.2.4.1 "*CPM Chat Message to e-mail Message*".

When the e-mail IWF receives an e-mail message from the e-mail user who had accepted the corresponding invitation, the e-mail IWF delivers the message to the CPM Client using MSRP SEND request(s) and it is handled as described in 6.4.3.3 "*E-mail Message to CPM Chat Message*".

Upon receiving a SIP BYE request, the e-mail IWF SHALL respond with a SIP 200 "OK", and MAY send an e-mail notification message to the e-mail user with appropriate text based on service provider policy to notify the e-mail user that the CPM Group Session has been left or the CPM 1-1 Session has been closed, as described in 6.4.2.4.2 "*CPM Session Leaving request to e-mail Message*".

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SMTP Commands [RFC5321]	CPM SIP INVITE header [headers from [RFC3261] unless otherwise noted]	Comment
MAIL FROM		Set by the e-mail IWF to the originating CPM User's corresponding e-mail address as described in section 6.4.1.
RCPT TO	Request-URI	Interworked by the e-mail IWF as described in section 6.4.1.
BY (i.e., parameter of extended MAIL FROM command of Deliver By SMTP Service Extension [RFC2852])		Set BY parameter of extended MAIL FROM command according to according to rules and procedures of [RFC2852] and service provider policy.

Table 54: CPM Session Invitation to e-mail - SMTP transaction details

Internet Message Format [RFC5322] header	Internet Message Format Parameter status	CPM SIP INVITE header [headers from [RFC3261] unless otherwise noted]	Comment
From	Mandatory	P-Asserted-Identity [RFC3325], if present, otherwise, From, Privacy header [RFC3323] and [RFC3325].	When CPM Chat Message is sent to one recipient, the SIP P-Asserted-Identity or the From header is used to find the corresponding e-mail From header as described in section 6.4.1. When CPM Chat Message is sent to a CPM Group, IWF assigns a new e-mail address to represent the group for the e-mail user, and is used as in the e-mail From header for all messages sent in relation to this session. When the Privacy is set to "id", the e-mail From header SHALL contain an anonymous URI according to [RFC3323] and optionally an alias or "Anonymous" as the display name.
Reply-To	Optional	Reply-To	If present, a SIP Reply-To header is interworked to an e-mail Reply-To header. When the Privacy is set to "id", the Reply-To header SHALL contain an anonymous URI.
Sender	Conditional		When the message is sent to a CPM Group, then the Sender header field is set to an e-mail address corresponding to message originator's address carried in Referred-By or From header.

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Date	Mandatory	Date or CPIM header: DateTime [RFC5438]	Set the e-mail Date to, in order of preference: – CPIM header: DateTime if available, otherwise, – the Date of the SIP INVITE request if available, otherwise, – the current date and time at the IWF.
To, Cc	Conditional	Request-URI (when sent to one recipient or when sent to a CPM Pre-defined Group) URI list body carrying the “recipient-list-history” [RFC5366] (when sent to more than one recipient)	In case of one recipient or when sent to a CPM Pre-defined group, set to mailto URI carried in Request-URI as described in section 6.4.1. In case of multiple recipients, set to the list of recipients in the “URI-List. The URIs with copyControl="to" are mapped to the e-mail [RFC5322] destination address “To:” header field. The URIs with copyControl="cc" are mapped to the e-mail [RFC5322] destination address “Cc:” header field. NOTE: The incoming copyControl=”bcc” is stripped off by the CPM Controlling Function before reaching the Interworking Function.
msg-id, In-Reply-To	Optional	Conversation-ID, Contribution-ID and InReplyTo-Contribution-ID.	Identities for the request, related to the Conversation-ID, the Contribution-ID and the ReplyTo-Contribution-ID. E-mail IWF uses In-Reply-To header to associate an e-mail message to a particular CPM Session. NOTE: See Appendix E (informative).
Subject	Optional	Subject	Set only if “Subject” header is available.
X-Priority [MAILEXT]	Optional	Priority	Set to corresponding value of Priority (i.e., 5 = "non-urgent"; 3 = "normal"; 1 = "urgent").
Message body	Optional		If requested by service provider policy, service provider generated text indicating that the e-mail user is invited to a session, information about the inviting user and the group (if any) and instructions on how to accept/reject or leave a session.

Table 55: CPM Session Invitation to e-mail – e-mail message details

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Response to SIP INVITE [RFC3261]	CPM headers Status	SMTP Commands [RFC5321] unless otherwise noted	Comment
	Conditional	content of the e-mail message [RFC5322]	The keyword for session 'accept' or 'reject' in the replying text from the e-mail user is interpreted by the IWF to determine the e-mail user's response. The exact definition of the replying text is set as per service provider policy. But at least it needs to carry a keyword for either session 'accept' or 'reject'.
Response code [RFC3261] Reason phrase [RFC3261]	Mandatory	SMTP response	Set the response code and reason phrase of the SIP response as follows: – SIP 200 "OK" sent when SMTP response is "250 OK" – SIP 4xx or 5xx with corresponding reason phrase is sent when SMTP response is Transient Negative Completion reply (4yz) or Permanent Negative Completion reply (5yz))
Call-ID	Mandatory		Set to the received Call-ID in the SIP INVITE request.
To	Mandatory		Set to the received To header field in the SIP INVITE request based on [RFC3261].
Via	Mandatory		Set to the received Via header field in the SIP INVITE request.
From	Mandatory		Set to the received From header field in the SIP INVITE request.
CSeq	Mandatory		Set to the received CSeq header field in the SIP INVITE request.
Content-Length	Mandatory		Set to the length of the SDP body.
Body	Conditional		If the Response code is SIP 200 "OK", set as an SDP answer according to [RFC3264], [RFC4566] and [RFC4975]. Otherwise, there will not be an SDP body.

Table 56: E-mail to CPM Session Invitation - SIP response details

6.4.2.4.1 CPM Chat Message to e-mail Message

NOTE: This section assumes that:

- a CPM Session for the CPM Chat Message delivery has been established on behalf of the e-mail user;
- a two-way transmission channel between the e-mail IWF and the SMTP server (serving the recipient e-mail user) has been established.

After the MSRP session has been established, the payload from the CPM Client is delivered using MSRP SEND request(s) to the e-mail IWF. Any e-mail message received within the scope of the CPM Session by the e-mail IWF is handled as described in 6.4.3.3 "*E-mail Message to CPM Chat Message*".

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When the e-mail IWF receives an MSRP SEND request, it performs the following:

1. SHALL wait until the entire CPM Chat Message is received according to the procedures as defined in [RFC4975] (if the CPM Chat Message is sent chunked using multiple MSRP SEND requests).
2. The e-mail IWF builds an e-mail message as specified in [RFC5322] and Table 58 by mapping the relevant headers and body from the MSRP SEND to the e-mail message.
3. The e-mail IWF initiates an e-mail transaction as specified in [RFC5321] and Table 57 by mapping the relevant headers and body from the MSRP SEND to send the message to the recipient.
4. If no error occurred, SHALL send MSRP 200 OK response according to [RFC4975]. Otherwise, the e-mail IWF SHALL respond with an appropriate error response code according to [RFC4975].

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SMTP Commands [RFC5321]	MSRP SEND request [headers from [RFC4975] unless otherwise noted]	Comment
MAIL FROM		Set by the e-mail IWF to the originating CPM User's corresponding e-mail address as described in section 6.4.1.
RCPT TO	Request-URI	Interworked by the e-mail IWF as described in section 6.4.1.
BY (i.e., parameter of extended MAIL FROM command of Deliver By SMTP Service Extension [RFC2852])		Set BY parameter of extended MAIL FROM command according to according to rules and procedures of [RFC2852] and service provider policy.

Table 57: CPM Chat Message to e-mail - SMTP transaction details

Internet Message Format [RFC5322] header	Internet Message Format Parameter status	MSRP SEND request header [headers from [RFC4975] unless otherwise noted]	Comment
From	Mandatory	CPIM header: From [RFC3862]	Set to CPIM header: From if present, otherwise set to the originating CPM User's corresponding e-mail address as described in section 6.4.1. When the Privacy is set to "id", the From header SHALL contain an anonymous URI according to [RFC3323] and optionally an alias or "Anonymous" as the display name.
Date	Mandatory	CPIM header: DateTime [RFC5438]	Set to CPIM header: DateTime if present, otherwise set to current date and time at the IWF.
To	Mandatory		Interwork as described in section 6.4.1.
X-Priority [MAILEXT]	Optional		Set per the service provider policy.
message body	Conditional	message body	Set per the payload of MSRP SEND request(s). If requested by service provider policy, service provider generated text indicating instructions on how to leave a session will be included. Additionally participant information may also be included according to service provider policy.

Table 58: CPM Chat Message to e-mail - e-mail message details

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6.4.2.4.2 CPM Session Leaving request to e-mail Message

Upon receiving SIP BYE request, the e-mail IWF MAY send an e-mail message towards the e-mail user with an appropriate text based on service provider policy to notify that the CPM Group Session has been left or the CPM 1-1 Session has been closed.

The e-mail IWF builds an e-mail notification message and initiates an e-mail transaction as specified in [RFC5322] and [RFC5321] and in Table 59 and Table 60 respectively, by mapping the relevant headers and body from the SIP BYE request to the e-mail message.

SMTP Commands [RFC5321]	**CPM SIP BYE header [headers from [RFC3261] unless otherwise noted]**	**Comment**
MAIL FROM		Set by the e-mail IWF to the originating CPM User's corresponding e-mail address as described in section 6.4.1.
RCPT TO	Request-URI	Interworked by the e-mail IWF as described in section 6.4.1.
BY (i.e., parameter of extended MAIL FROM command of Deliver By SMTP Service Extension [RFC2852])		Set BY parameter of extended MAIL FROM command according to according to rules and procedures of [RFC2852] and service provider policy.

Table 59: CPM Session leaving request to e-mail - SMTP transaction details

Internet Message Format [RFC5322] header	**Internet Message Format Parameter status**	**CPM SIP BYE header [headers from [RFC3261] unless otherwise noted]**	**Comment**
From	Mandatory	P-Asserted-Identity [RFC3325], if present, otherwise, From, Privacy header [RFC3323] and [RFC3325].	The P-Asserted-Identity or the From header is used to find the corresponding e-mail From header as described in section 6.4.1. When the Privacy is set to "id", the From header SHALL contain an anonymous URI according to [RFC3323] and optionally an alias or "Anonymous" as the display name.
Sender	Conditional		When the request is sent to a CPM Group, then the Sender header field is set to an e-mail address corresponding to the message originator's address carried in the Referred-By or From header.
Date	Mandatory		Set to CPIM header: DateTime if present, otherwise set to current date and time at the IWF.

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To, Cc	Conditional	Request-URI (when sent to one recipient or when sent to a CPM Pre-defined Group) URI list body carrying the “recipient-list-history” [RFC5366] (when sent to more than one recipient)	In the case of one recipient or when sent to a CPM Pre-defined group, set to mailto URI carried in Request-URI as described in section 6.4.1. In the case of multiple recipients, set to the list of recipients in the “URI-List. The URIs with copyControl="to" are mapped to the e-mail [RFC5322] destination address “To:” header field. The URIs with copyControl="cc" are mapped to the e-mail [RFC5322] destination address “Cc:” header field. NOTE: The incoming copyControl=”bcc” is stripped off by the CPM Controlling Function before reaching the Interworking Function.
X-Priority [MAILEXT]	Optional		Set per the service provider policy.
message body	Conditional		If requested by service provider policy, service provider generated text indicating instructions on how to leave a session will be included.

Table 60: CPM Session leaving request to e-mail - e-mail message details

The e-mail IWF generates a SMTP QUIT command according to rules and procedures of [RFC5321] to close transmission channel with remote SMTP server serving the e-mail user.

6.4.2.4.3 Sending Participant Information to e-mail user

When the CPM Group Session has been established, the IWF subscribes to receive Participant Information as described in section 7.3.10 of [OMA-CPM-TS-Conv-Func].

When the IWF receives the information in a SIP NOTIFY request, it SHALL construct and send an e-mail message to the e-mail user as described in Table 61 and Table 62: Participant Information to e-mail - e-mail message detailsbelow. The frequency of sending this information to the e-mail user is based on service provider policy.

SMTP Commands [RFC5321]	**SIP NOTIFY request [headers from [RFC3265] unless otherwise noted]**	**Comment**
MAIL FROM		Set by the e-mail IWF to the originating CPM User’s corresponding e-mail address as described in section 6.4.1.
RCPT TO	Request-URI	Interworked by the e-mail IWF as described in section 6.4.1.
BY (i.e., parameter of extended MAIL FROM command of Deliver By SMTP Service Extension [RFC2852])		Set the BY parameter of the extended MAIL FROM command according to according to the rules and procedures of [RFC2852] and service provider policy.

Table 61: Participant Information to e-mail - SMTP transaction detailss

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Internet Message Format [RFC5322] header	Internet Message Format Parameter status	SIP NOTIFY request [headers from [RFC3265] unless otherwise noted]	Comment
From	Mandatory	P-Asserted-Identity [RFC3325], if present, otherwise, From.	Set as described in step 2b in section 6.4.2.4, i.e. set to the e-mail address assigned to represent the CPM Group for the e-mail user.
Sender	Conditional		Set as described in step 2b in section 6.4.2.4, i.e. set to the e-mail address assigned to represent the CPM Group for the e-mail user.
Date	Mandatory		Set to current date and time at the IWF.
To	Mandatory		Set to the mailto URI carried in the Request-URI received in the corresponding SIP INVITE request as described in section 6.4.1.
X-Priority [MAILEXT]	Optional		Set per the service provider policy.
message body	Conditional	message body	Set according to the information received in the SIP NOTIFY request. The actual information used and formatted into a textual or multimedia message from the SIP NOTIFY request is according to service provider policy.

Table 62: Participant Information to e-mail - e-mail message details

6.4.3 Interworking from E-mail to CPM

In general the handling of the e-mail IWF for interworking e-mail messages to CPM requests is as follows:

- When the e-mail IWF receives an SMTP mail transaction [RFC5321] for an e-mail message that can be interworked to a CPM Standalone Message with a size smaller than or equal to 1300 bytes, it SHALL handle the SMTP mail transaction as described in section 6.4.3.1 "*E-mail Message to Pager Mode CPM Standalone Message*".
- When the MMS IWF receives an SMTP mail transaction [RFC5321] for an e-mail message that needs to be interworked to a CPM Standalone Message with a size bigger than 1300 bytes, it SHALL handle the SMTP mail transaction as described in section 6.4.3.2 "*E-mail Message to Large Message Mode CPM Standalone Message"*.
- When the e-mail IWF receives an SMTP mail transaction [RFC5321] for an e-mail message that can be correlated to an ongoing CPM Session, it SHALL handle the SMTP mail transaction as described in section 6.4.3.3 "*E-mail Message to CPM Chat Message*".
- When the e-mail IWF receives an SMTP mail transaction [RFC5321] for an e-mail message that can be interpreted as a session leaving request, it SHALL handle the SMTP mail transaction as described in section 6.4.3.4 "*E-mail Message to CPM Session Leaving request mapping*".

6.4.3.1 E-mail Message to Pager Mode CPM Standalone Message

When the IWF receives an e-mail message, it SHALL perform the following:

1. It performs MX lookup verification and subsequent SMTP commands (e.g., MAIL FROM, RCPT TO) according to [RFC5321]. Once the DATA receipt is completed, if the message is short (i.e., at most 1300 bytes), the e-mail IWF

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generates a Pager Mode CPM Standalone Message, based on the received e-mail message and in accordance with section 7.2.1.1 of [OMA-CPM-TS-Conv-Func], with the clarifications given in Table 63 and Table 64 below.

2. It sends the Pager Mode CPM Standalone Message towards the recipient CPM User, according to the rules and procedures of the SIP/IP core.

3. If it receives a positive response to the Pager Mode CPM Standalone Message (e.g., SIP 200 "OK" or SIP 202 "Accepted"), it sends a 250 "OK" in response of the DATA according to the rules and procedures of [RFC5321].

4. If it receives a negative response to the Pager Mode CPM Standalone Message (e.g., SIP 4xx or SIP 5xx response), it sends a corresponding 5yz (permanent negative completion reply) in response of the DATA according to rules and procedures of [RFC5321].

CPM SIP MESSAGE header [headers from [RFC3261] unless otherwise noted]	**SMTP [command from [RFC5321] unless otherwise noted]**	**Comment**
Request-URI and To	RCPT TO:	Interworked by the e-mail IWF (map to a SIP URI following a lookup).

Table 63: E-mail message to Pager Mode CPM Standalone Message - SMTP level

CPM SIP MESSAGE header **[headers from [RFC3428] or [RFC3261] unless otherwise noted]**	**CPM MESSAGE Parameter status**	**DATA part of the SMTP Information element** **[headers from [RFC5322] unless otherwise noted]**	**Comment**
Not used if there is only one recipient. If there is more than one recipient, all recipients are added in the CPM Standalone Message body as part of a recipient-list-history body as per [RFC5365]	Optional	**MIME -** To:, Cc:, Bcc:	
From, P-Asserted-Identity [RFC3325]	Mandatory	**SMTP -** MAIL FROM:	The IWF SHALL include a Non-CPM Communication Service Identifier as defined in Appendix D with the value set to “email”.
Date	Optional	**MIME** Date	Set to date provided by SMTP, otherwise set to current date and time at the IWF.
Expires	Optional	BY (i.e., parameter of extended MAIL FROM command of Deliver By SMTP Service Extension [RFC2852])	Set to value received in BY parameter of extended MAIL FROM command according to rules and procedures of [RFC3261] and service provider policy.
Priority	Optional	**MIME -** X-Priority [MAILEXT]	Set to corresponding value of X-Priority (i.e., 5 = CPM "non-urgent"; 3 = "normal"; 1 = "urgent").

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imdn.Disposition-Notification [RFC5438]	Conditional	Disposition-Notification-To and disposition-type [RFC3798]	When [RFC3798] "Disposition-Notification-To is "required", include "positive-delivery, negative-delivery" in the imdn.Disposition-Notification header. When [RFC3798] "disposition-type" is set to "displayed", include "display" in the imdn.Disposition-Notification.
Content-Type	Mandatory	**MIME** - Content-Type	Set top level type to 'message/cpim' and set sub-type(s) to corresponding body types received in SMTP.
Subject	Optional	**MIME** - Subject:	Set only if "Subject" header is set in the SMTP message.
Max-Forwards	Mandatory		Set per the service provider policy.
Body	Conditional	content (body of SMTP DATA protocol unit) [RFC5321	Set to corresponding body types received in SMTP.
Via	Mandatory		Set to the address of the IWF.
CSeq	Mandatory		Set by the IWF.
Call-ID	Mandatory		Set by the IWF.

Table 64: E-mail message to Pager Mode CPM Standalone Message - e-mail message level

6.4.3.2 E-mail Message to Large Message Mode CPM Standalone Message

When the IWF receives an e-mail message, it SHALL perform the following:

1. It performs MX lookup verification and subsequent SMTP commands (i.e., MAIL FROM, RCPT TO).
2. Once the DATA receipt is completed, if the size of the message is greater than the maximum size of a Pager Mode CPM Standalone Message (i.e., more than 1300 bytes), the IWF initiates a MSRP session with the target CPM User including the CPM Feature Tag "3gpp-service.ims.icsi.oma.cpm.largemsg" based on the received e-mail message and in accordance with section 7.2.1.2 of [OMA-CPM-TS-Conv-Func], with the clarifications given in Table 65 and Table 66.
3. When the MSRP session is established, the IWF sends the content received in the body of SMTP DATA protocol unit towards the CPM User via one or more MSRP SEND request(s) according to rules and procedures of [RFC4975], with the clarifications given in Table 67.
4. Upon receipt of the final MSRP 200 "OK" response from the CPM recipient, the IWF sends a BYE request towards CPM recipient to close the MSRP session.

CPM headers [headers from [RFC3261] unless otherwise noted]	**SMTP Commands [RFC5321]**	**Comment**
Request-URI and To	RCPT To:	Set to the CPM User's CPM Address corresponding to CPM User's e-mail address received in RCPT TO command [RFC5321] according to the mapping described in section 6.4.1.

Table 65: E-mail message to Large Message Mode CPM Standalone Message - SIP INVITE, SMTP level

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CPM headers [headers from SIP INVITE [RFC3261] unless otherwise noted]	CPM header parameter status	Internet Message Format [RFC5322] headers	Comment
From	Mandatory	From	Set according to the e-mail address received in the From header [RFC5322] as a mailto URI in From header [RFC3261]. The IWF SHALL include a Non-CPM Communication Service Identifier as defined in Appendix D with the value set to “email”.
Request-URI, To	Mandatory	To	Set to the CPM User’s CPM Address corresponding to CPM User’s e-mail address received in To header [RFC5322] according to the mapping described in section 6.4.1.
Date	Optional	Date	Set to date provided in SMTP DATA protocol unit, otherwise set to current date and time at the IWF.
Contribution-ID, Conversation-ID and InReplyTo-Contribution-ID.	Mandatory	msg-id, In-Reply-To, References	Identities for the message, related to the msg-id, In-Reply-To, and References. NOTE: See Appendix E (informative).
Content-Type	Mandatory	**MIME** - Content-Type	Set top level type to ‘message/cpim’ and set sub-type(s) to corresponding body types received in SMTP.
Subject	Optional	Subject	Set only if “Subject” header is available.
Priority	Optional	X-Priority [MAILEXT]	Set to corresponding value of X-Priority.
Message-Expires (see [OMA-CPM-TS-Conv-Func])	Conditional	BY (i.e., parameter of extended MAIL FROM command of Deliver By SMTP Service Extension [RFC2852])	Set Message-Expires header according to received value in BY parameter of extended MAIL FROM command following the procedures of Message-Expires specified in [OMA-CPM-TS-Conv-Func].
imdn.Disposition-Notification : positive-delivery [RFC5438]	Conditional	Disposition-Notification-To [RFC3798]	When Disposition-Notification-To is present, set the Disposition-Notification to “positive-delivery” and “negative-delivery”.
Max-Forwards	Mandatory		Set per the service provider policy.
Via	Mandatory		Set to the address of the IWF.
CSeq	Mandatory		Set in accordance with [RFC3261].
Call-ID	Mandatory		Set in accordance with [RFC3261].

Table 66: E-mail to Large Message Mode CPM Standalone Message - SIP INVITE, e-mail message level

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MSRP SEND header [headers from [RFC4975] unless otherwise noted]	MSRP SEND parameter status	Internet Message Format [RFC5322] headers unless otherwise noted	Comment
To-Path	Mandatory		Set in accordance with [RFC4975].
From-Path	Mandatory		Set in accordance with [RFC4975].
Message-ID	Mandatory		Set in accordance with [RFC4975].
Byte-Range	Conditional		Set per the byte chunk being sent.
Content Type	Conditional		Set in accordance with [RFC4975].
Body	Optional	content (body of SMTP DATA protocol unit) [RFC5321]	Set according to rules and procedures of [RFC4975].
CPIM header: DateTime [RFC5438]	Conditional	Date	Set the CPIM: DateTime to the Date if a CPM Disposition Notification is requested.

Table 67: E-mail message to Large Message Mode CPM Standalone Message- MSRP details

6.4.3.3 E-mail Message to CPM Chat Message

When the e-mail IWF receives an e-mail message which it can correlate to an ongoing CPM Session, it SHALL perform the following:

1. It generates one or more MSRP SEND requests (more than one if chunking is needed to transfer the e-mail message) based on [RFC4975].
2. SHALL send the one or more MSRP SEND requests towards the CPM Client, per Table 68.

MSRP SEND header [headers from [RFC4975] unless otherwise noted]	MSRP SEND parameter status	Internet Message Format [RFC5322] headers unless otherwise noted	Comment
To-Path	Mandatory		Set by the IWF.
From-Path	Mandatory		Set by the IWF.
Message-ID	Mandatory		Set by the IWF.
Byte-Range	Conditional		Set by the IWF per the byte chunk being sent.
Content-Type	Mandatory		Set by the IWF in accordance with [RFC4975].
Body	Optional	content (body of SMTP DATA protocol unit) [RFC5321]	Set according to rules and procedures of [RFC4975].
CPIM header: DateTime [RFC5438]	Conditional	Date	Set the CPIM: DateTime to the Date otherwise set to current date and time at the IWF.

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CPIM header: From [RFC5438]	Mandatory	From	Set according to the e-mail address received in the From header [RFC5322] as a mailto URI in From header [RFC3261].
Success-Report and Failure Report	Conditional		Set per the service provider policy.

Table 68: e-mail to CPM Chat Message – MSRP SEND details

6.4.3.4 E-mail Message to CPM Session Leaving request mapping

Upon receiving an e-mail message containing service provider defined text indicating the e-mail user wants to leave an ongoing CPM Session, the e-mail IWF SHALL send a SIP BYE request according to [RFC3261] and [OMA-CPM-TS-Conv-Func] to notify that the e-mail user has left the CPM Group Session, or that the CPM 1-1 Session has been closed.

6.5 Interworking with OMA SIMPLE IM

There are two models of interworking with SIMPLE IM supported;

1) CPM Transition:
    - Support in the CPM Participating Function of SIMPLE IM Clients, described in [OMA-CPM-TS-Conv-Func], Appendix G "*Interoperability with OMA SIMPLE IM Clients*";
2) NNI Interworking:
    - Support of interworking with a SIMPLE IM enabled network via the CPM Interworking Function, described in this document.

6.5.1 NNI Interworking

When interworking with OMA-SIMPLE-IM Enabler described by [OMA-SIMPLE-IM], the following additional procedures shall be applied:

1. All feature tags shall be mapped according to [OMA-CPM-TS-Conv-Func], Appendix G "*Interoperability with OMA SIMPLE IM Clients*", Table 3, "*SIMPLE IM Enabler Feature Tags Mapping to/from OMA CPM Enabler Identifiers*"
2. When interworking from OMA-SIMPLE IM to OMA CPM, the CPM Interworking Function SHALL examine the SIP header fields to see whether the Contribution-ID and Conversation-ID header fields are present. If either header field is missing, the CPM Interworking Function SHALL insert the appropriate header field as per procedures described in Appendix C.1.1, Appendix C.1.2 and Appendix G of [OMA-CPM-TS-Conv-Func].
3. When interworking a 1-1 Session with OMA-SIMPLE-IM with the first message in SIP INVITE, and the session is established from:
    a. OMA-SIMPLE-IM Client towards a CPM Client, the CPM Interworking Function SHALL behave as a B2BUA and accept the SIP INVITE on behalf of the CPM Client. The CPM Interworking Function SHALL send a CPM 1-1 Session invitation to the recipient CPM Client and once the CPM Client accepted it, the CPM Interworking Function SHALL provide the first message received in SIP INVITE from the OMA-SIMPLE-IM leg into the MSRP session of the CPM leg. If the CPM 1-1 Session was not successfully set up, the CPM Interworking Function MAY determine other ways to deliver the first message received in an 1-1 IM Session to the CPM Client, subject to service provider policies (e.g. sending the message as a CPM Standalone Pager Mode message if supported, etc.).

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6.6 Interworking Security

Confidentiality and integrity for Media Plane media content should be taken into account for CPM interworking security if it is requested by the CPM User and subject to service provider policies. In this section, security for CPM interworking only with SMS and MMS will be addressed.

Since neither the SMS network nor the MMS network provides confidentiality protection (cf. [3GPP TS23.040] and/or [X.S0004-641]; [3GPP TS23.204]; [3GPP TS23.140] and/or [X.S0016-000]), it follows that the IWF cannot provide end to end protection of CPM requests when CPM interworking with SMS or MMS. Therefore:

1. For the requests from CPM to SMS or to MMS, an incoming CPM request requiring end to end protection SHALL be rejected by the SMS IWF or MMS IWF, respectively.
2. For the requests from SMS or MMS to CPM, an incoming SMS or MMS does not have confidentiality protection, so the IWF SHALL NOT end to end protect the CPM request resulting from the interworking with SMS or MMS.

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Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
n/a	n/a	No prior version

A.2 Draft/Candidate Version 2.0/2.1 History

Document Identifier	Date	Sections	Description
Candidate Version OMA-TS-CPM_Interworking_Function - V2_0	13 Jan 2015		Status changed to Candidate by TP TP Ref # OMA-TP-2015-0002-INP_CPM_V2_0_ERP_for_Candidate_re_approval
Draft Versions OMA-TS-CPM_Interworking_Function-V2_1	02 Mar 2015	All	Initial Draft with content from v2.0 document (version of 20150228-D)
	16 Oct 2015	6.2	Incorporated CR: • OMA-COM-CPM-2015-0103R02-CR_IWF_TS_AI064_MLD035_unsuccessfulSMS
	23 Dec 2015	Appendix F, 6.2.3, 6.2.4	Incorporated CR: • OMA-COM-CPM-2015-0154R01-CR_IWF_TS_CONR_D005.doc
	07 Jan 2016	4.3; 5; 6.2; 6.3	Incorporated CRs: • OMA-COM-CPM-2016-0001R01-CR_CONR_D002 • OMA-COM-CPM-2015-0171R03-CR_CONR_D009 • OMA-COM-CPM-2015-0173R02-CR_CONR_C150_IWF • Editorial updates addressing CONRR comments: D001, D010, D011.
Candidate Version OMA-TS-CPM_Interworking_Function - V2_1	09 Feb 2016	n/a	Status changed to Candidate by TP TP Ref # OMA-TP-2016-0035-INP_CPM_V2_1_ERP_for_Candidate_approval

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Appendix B. Static Conformance Requirements (Normative)

The notation used in this appendix is specified in [SCRRULES].

B.1 SCR for Interworking Selection Function

Item	Function	Reference	Requirement
CPM-TS-Isf-S-001-M	Procedures at Interworking Selection Function	5	

B.2 SCR for Interworking Function

Item	Function	Reference	Requirement
CPM-TS-Int-S-001-M	Procedures at Interworking Function	6	CPM-TS-Int-S-002-O OR CPM-TS-Int-S-010-O OR CPM-TS-Int-S-023-O
CPM-TS-Int-S-002-O	Interworking with SMS	6.2	CPM-TS-Int-S-003 OR CPM-TS-Int-S-004-O
CPM-TS-Int-S-003-O	IP Short Message Gateway (IP-SM-GW) Realization	6.2.1	
CPM-TS-Int-S-004-O	External Short Message Entity Realization	6.2.2	CPM-TS-Int-S-031-O AND CPM-TS-Int-S-005-O AND CPM-TS-Int-S-032-O AND CPM-TS-Int-S-033-O AND CPM-TS-Int-S-007-O AND CPM-TS-Int-S-008-O AND CPM-TS-Int-S-009-O AND CPM-TS-Int-S-029-O
CPM-TS-Int-S-031-O	CPM to SMS, General	6.2.2.1	
CPM-TS-Int-S-005-O	CPM to SMS, Pager Mode CPM Message to SMS message mapping, submit_sm	6.2.2.1.1, and Table 1, Table 2	
CPM-TS-Int-S-006-O	CPM to SMS, SMS status report to CPM Delivery Notification	6.2.2.1.2, and Table 3	
CPM-TS-Int-S-032-O	CPM to SMS, MSRP to SMS message mapping	6.2.2.1.5, and Table 7	
CPM-TS-Int-S-033-O	CPM to SMS, CPM Session Invitation to SMS message mapping	6.2.2.1.3, and Table 4, Table 5	
CPM-TS-Int-S-007-O	SMS to CPM, General	6.2.2.2	
CPM-TS-Int-S-008-O	SMS Message to Pager Mode CPM Standalone Message	6.2.2.2.1, and Table 9, Table 10	
CPM-TS-Int-S-009-O	SMS Message to CPM Chat Message	6.2.2.2.2	
CPM-TS-Int-S-029-O	SMS Message to Large Message Mode CPM Standalone Message	6.2.2.2.3, and Table 11	
CPM-TS-Int-S-010-O	Interworking with MMS	6.3	CPM-TS-Int-S-011-O
CPM-TS-Int-S-011-O	Interworking with MMS, MM4 Realization	6.3.1	CPM-TS-Int-S-012-O

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Item	Function	Reference	Requirement
CPM-TS-Int-S-012-O	Interworking with MMS, MM4 Realization, messages	6.3.1	CPM-TS-Int-S-015-O AND CPM-TS-Int-S-018-O AND CPM-TS-Int-S-019-O AND CPM-TS-Int-S-022-O AND CPM-TS-Int-S-034-O AND CPM-TS-Int-S-037-O
CPM-TS-Int-S-013-O	Interworking with MMS, MM4 Realization, delivery notifications	6.3.1	CPM-TS-Int-S-016-O AND CPM-TS-Int-S-020-O
CPM-TS-Int-S-014-O	Interworking with MMS, MM4 Realization, read reports	6.3.1	CPM-TS-Int-S-017-O AND CPM-TS-Int-S-021-O
CPM-TS-Int-S-034-O	Interworking with MMS, MM4 Realization, session interworking	6.3.1	CPM-TS-Int-S-039-O AND CPM-TS-Int-S-040-O AND CPM-TS-Int-S-041-O AND CPM-TS-Int-S-042-O AND CPM-TS-Int-S-035-O AND CPM-TS-Int-S-036-O
CPM-TS-Int-S-015-O	Pager Mode CPM Standalone Message to MMS Message	6.3.1.1.1, and Table 12, Table 13, Table 14	
CPM-TS-Int-S-016-O	MMS Delivery Report to CPM Disposition Notification	6.3.1.1.3, and Table 17, Table 18, Table 19	
CPM-TS-Int-S-017-O	MMS Read Reply to CPM Standalone Message Disposition Notification	6.3.1.1.4, and Table 20, Table 21, Table 22	
CPM-TS-Int-S-018-O	Large Message Mode CPM Standalone Message to MMS Message	6.3.1.1.2, and Table 15, Table 16	
CPM-TS-Int-S-037-O	CPM File Transfer to MMS Message	6.3.1.1.5, and Table 23, Table 24	
CPM-TS-Int-S-019-O	MMS to Pager Mode CPM Standalone Message	6.3.1.2.1, and Table 35, Table 36, Table 37, Table 38	
CPM-TS-Int-S-020-O	CPM Delivery Notification to MMS MM4_delivery_report	6.3.1.2.3, and Table 42, Table 43	
CPM-TS-Int-S-021-O	CPM Read Report to MMS	6.3.1.2.4, and Table 44, Table 45	
CPM-TS-Int-S-022-O	MMS Message to a Large Message Mode CPM Standalone Message	6.3.1.2.2, and Table 39, Table 40	

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Item	Function	Reference	Requirement
CPM-TS-Int-S-039-O	CPM Session Invitation to MMS Message	6.3.1.1.6.1, and Table 25, Table 26, Table 27	
CPM-TS-Int-S-040-O	CPM Chat Message to MMS Message	6.3.1.1.6.2, and Table 28, Table 29	
CPM-TS-Int-S-041-O	CPM-Originated Session Leaving request	6.3.1.1.6.4, and Table 31, Table 32	
CPM-TS-Int-S-042-O	Sending Participant Information to MMS User	6.3.1.1.6.6, and Table 33, Table 34	
CPM-TS-Int-S-035-O	MMS Message to CPM Chat Message	6.3.1.2.5, and Table 46	
CPM-TS-Int-S-036-O	MMS Originated Session Leaving request Handling	6.3.1.1.6.5	
CPM-TS-Int-S-023-O	Interworking with e-mail	6.4	CPM-TS-Int-S-024-O
CPM-TS-Int-S-024-O	Interworking with e-mail, SMTP Realization	6.4.1	CPM-TS-Int-S-025-O AND CPM-TS-Int-S-026-O AND CPM-TS-Int-S-027-O AND CPM-TS-Int-S-030-O AND CPM-TS-Int-S-038-O AND CPM-TS-Int-S-043-O AND CPM-TS-Int-S-044-O AND CPM-TS-Int-S-045-O AND CPM-TS-Int-S-046-O AND CPM-TS-Int-S-047-O AND CPM-TS-Int-S-048-O
CPM-TS-Int-S-025-O	Interworking with e-mail, CPM to e-mail, Pager Mode CPM Message to e-mail mapping	6.4.2.1, and Table 47, Table 48, Table 49	
CPM-TS-Int-S-026-O	Interworking with e-mail, e-mail mapping to CPM	6.4.2.2, and Table 50, Table 51	
CPM-TS-Int-S-038-O	CPM File Transfer to e-mail message	6.4.2.3, and Table 52, Table 53	
CPM-TS-Int-S-043-O	CPM Session Invitation to e-mail Message	6.4.2.4, and Table 54, Table 55, Table 56	
CPM-TS-Int-S-044-O	CPM Chat Message to e-mail Message	6.4.2.4.1, and Table 57, Table 58	

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Item	Function	Reference	Requirement
CPM-TS-Int-S-045-O	CPM Session Leaving request to e-mail Message	6.4.2.4.2, and Table 59, Table 60	
CPM-TS-Int-S-046-O	Sending Participant Information to e-mail user	6.4.2.4.3, and Table 61, Table 62	
CPM-TS-Int-S-030-O	Interworking with e-mail, e-mail mapping to CPM, e-mail to Pager Mode CPM Message	6.4.3.1, and Table 63, Table 64	
CPM-TS-Int-S-027-O	Interworking with e-mail, e-mail mapping to CPM, e-mail to Large Message Mode CPM Message	6.4.3.2, and Table 65, Table 66, Table 67	
CPM-TS-Int-S-047-O	E-mail Message to CPM Chat Message	6.4.3.3, and Table 68	
CPM-TS-Int-S-048-O	E-mail Message to CPM Session Leaving request mapping	6.4.3.4	

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Appendix C. Release Version in User-Agent and Server Headers

C.1 Version 1.0

User-Agent and Server headers are used to indicate the release version and product information of the CPM Interworking Function.

The IWF shall implement the User-Agent and Server headers, according to rules and procedures of [RCF3261] with the clarifications in this subclause specific for IWF.

The User-Agent and Server headers ABNF are specified in [RFC3261] and extended as follows:

```
Server = "Server" HCOLON server-val *(LWS server-val)

User-Agent = "User-Agent" HCOLON server-val *(LWS server-val)

server-val = product / comment

product = IWF-product / token [SLASH product-version]

product-version = token
```

This specification allows having several server-val tags for Server and User-Agent headers. The first of those server-val tags shall be encoded according to the following ABNF:

```
IWF-product = iwf-type-token "-" iwf-device-token (SLASH iwf-product-version)

iwf-type-token = "IWF-SMS" / "IWF-MMS" / "IWF-e-mail" / token

iwf-device-token = "client" / "serv" / token

iwf-product-version = "OMA1.0"
```

Example 1:

In this example the IWF acting as a UAC is an OMA IWF release version 1.0 product. The IWF interworks with MMS. The IWF has inserted its own company and product name and version by appending "Arena-Messaging1000/v1.01".

```
User-Agent: IWF-MMS-client/OMA1.0 Arena-Messaging1000/v1.01
```

Example 2:

In this example the IWF acting as a UAS is an OMA IWF release version 1.0 product. The IWF interworks with MMS. The IWF has inserted its own company and product name and version by appending "Arena-Messaging1000/v1.01".

```
Server: IWF-MMS-serv/OMA1.0 Arena-Messaging1000/v1.01
```

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C.2 Version 2.0

For CPM version 2.0 the above provisions apply and use the following value for:

```
iwf-product-version = "OMA2.0"
```

Example 1:

In this example the IWF acting as a UAC is an OMA IWF release version 2.0 product. The IWF interworks with MMS. The IWF has inserted its own company and product name and version by appending "Arena-Messaging1000/v2.01".

```
User-Agent: IWF-MMS-client/OMA2.0 Arena-Messaging1000/v1.01
```

Example 2:

In this example the IWF acting as a UAS is an OMA IWF release version 2.0 product. The IWF interworks with MMS. The IWF has inserted its own company and product name and version by appending "Arena-Messaging1000/v5.01".

```
Server: IWF-MMS-serv/OMA2.0 Arena-Messaging1000/v5.01
```

C.3 Version 2.1

For CPM version 2.1 the same provisions as for Version 2.0 above apply, with the following change:

```
iwf-product-version = "OMA2.1"
```

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Appendix D. Non-CPM Communication Service Identifier

The Non-CPM Communication Service Identifier identifies the Non-CPM Communication Service a CPM request originated from.

The Non-CPM Communication Service Identifier is realized via a URI parameter to a SIP URI as defined in section 19.1 of [RFC3261] or to a tel URI as defined in section 3 of [RFC3966].

The Non-CPM Communication Service Identifier URI parameter SHALL be part of the 'From' address of a CPM request when that CPM request is originated by a non-CPM user, the Non-CPM Communication Service Identifier URI parameter MAY be part of the 'To' address of a CPM request when that CPM request is originated by a CPM User and the CPM request is a reply to a CPM request that was originated by a non-CPM User.

The following ABNF defines the Non-CPM Communication Service Identifier as a URI parameter:

NCCSID = "nccsid=" ("SMS" / "MMS" / "email" / other-nccsid)

other-nccsid = token

For SIP URIs this "NCCSID" rule is the instantiation of the "other-param" rule defined in [RFC3261] and for TEL URIs the NCCSID rule is the instantiation "parameter" rule defined in [RFC3966].

Example URIs including a Non-CPM Communication Service Identifier are as follows:

sip:alice@example.com;nccsid=SMS

tel:+11234561111;nccsid=MMS

sip:bob@example.com;nccsid=Skype

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Appendix E. Mapping of CPM Standalone Message and e-mail identities (Informative)

The Appendix provides information about how one could map Pager Mode CPM Standalone Message / Large Message Mode CPM Standalone Message identities with the e-mail identities.

E.1 RFC5322 parameters

Paraphrasing [RFC5322] we identify the following message identity parameters:

- Message-ID: optional. Should be filled. Host generated. Contains a unique message identifier that refers to a particular version of a particular message. Pertains to exactly one instantiation of a particular message; subsequent revisions to the message each receive new message.
- The "In-Reply-To:" and "References:" fields are used when creating a reply to a message. They hold the message identifier of the original message and the message identifiers of other messages (for example, in the case of a reply to a message which was itself a reply). The "In-Reply-To:" field may be used to identify the message (or messages) to which the new message is a reply, while the "References:" field may be used to identify a "thread" of conversation.
- When creating a reply to a message, the "In-Reply-To:" and "References:" fields of the resultant message are constructed as follows:
    - "In-Reply-To:" will contain the contents of the "Message-ID:" field of the message to which this one is a reply (the "parent message"). If there is more than one parent message, then the "In-Reply-To:" field will contain the contents of all of the parents' "Message-ID:" fields. If there is no "Message-ID:" field in any of the parent messages, then the new message will have no "In-Reply-To:" field.
    - "References:" will contain the contents of the parent's "References:" field (if any) followed by the contents of the parent's "Message-ID:" field (if any). If the parent message does not contain a "References:" field but does have an "In-Reply-To:" field containing a single message identifier, then the "References:" field will contain the contents of the parent's "In-Reply-To:" field followed by the contents of the parent's "Message-ID:" field (if any). If the parent has none of the "References:", "In-Reply-To:", or "Message-ID:" fields, then the new message will have no "References:" field.

E.2 CPM Parameters

Paraphrasing [OMA-CPM-TS-Conv-Func] we identify the following message identity parameters:

- Conversation-ID
    - The CPM Conversation is uniquely identified by a CPM Conversation Identity
- Contribution-ID
    - The CPM Standalone Message or CPM Session Invitation is uniquely identified by a CPM Contribution Identity.
- InReplyTo-Contribution-ID

E.2.1 E-mail to CPM parameters mapping

The figure below shows the mapping to be done by the e-mail/IWF upon receipt of the first e-mail interworked to a new CPM conversation.

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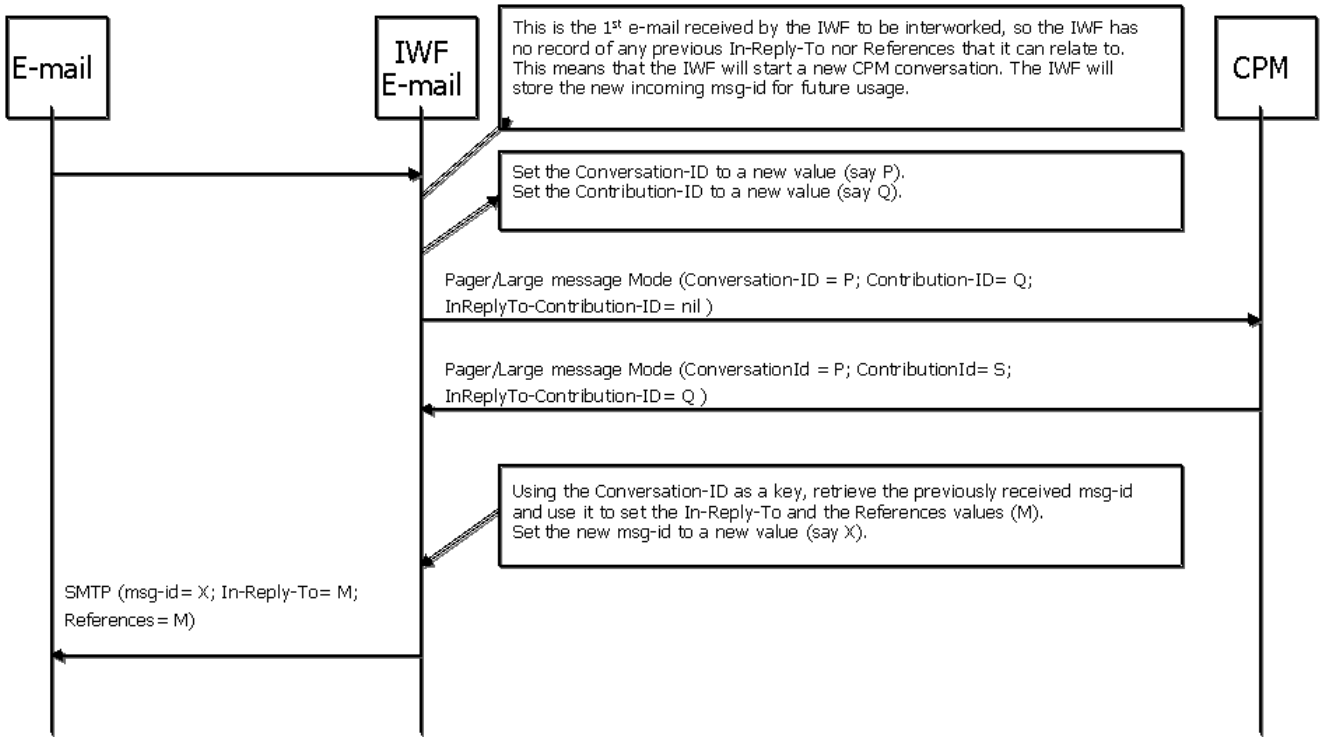
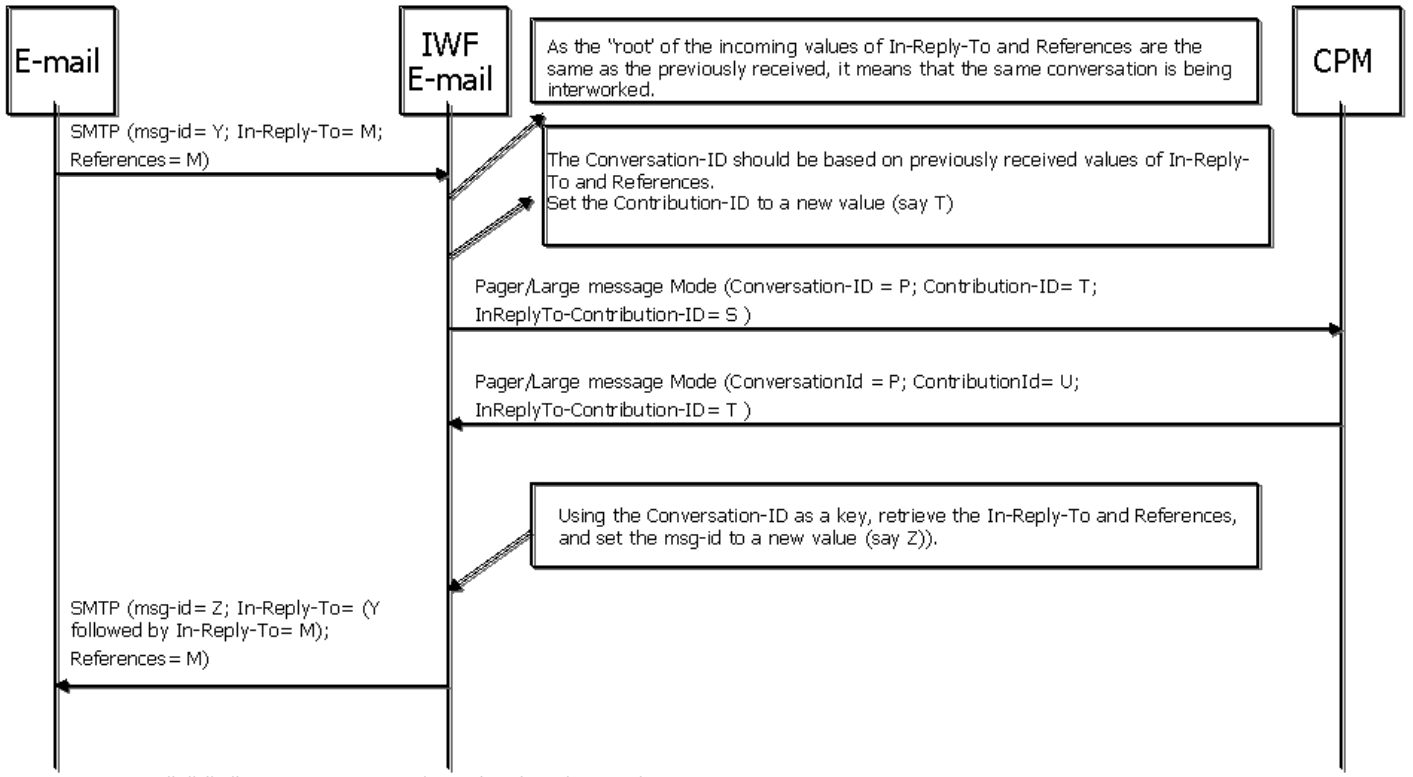


The figure below shows the mapping to be done by the e-mail/IWF upon receipt of another e-mail, interworked to an already existing CPM conversation.



NB: "Y", "M", ... are not necessarily single values, but can be composites.
As an example: "Y followed by msg-Id= M" is carried in the In-Reply-To of last step, which may come back at the following interworking.

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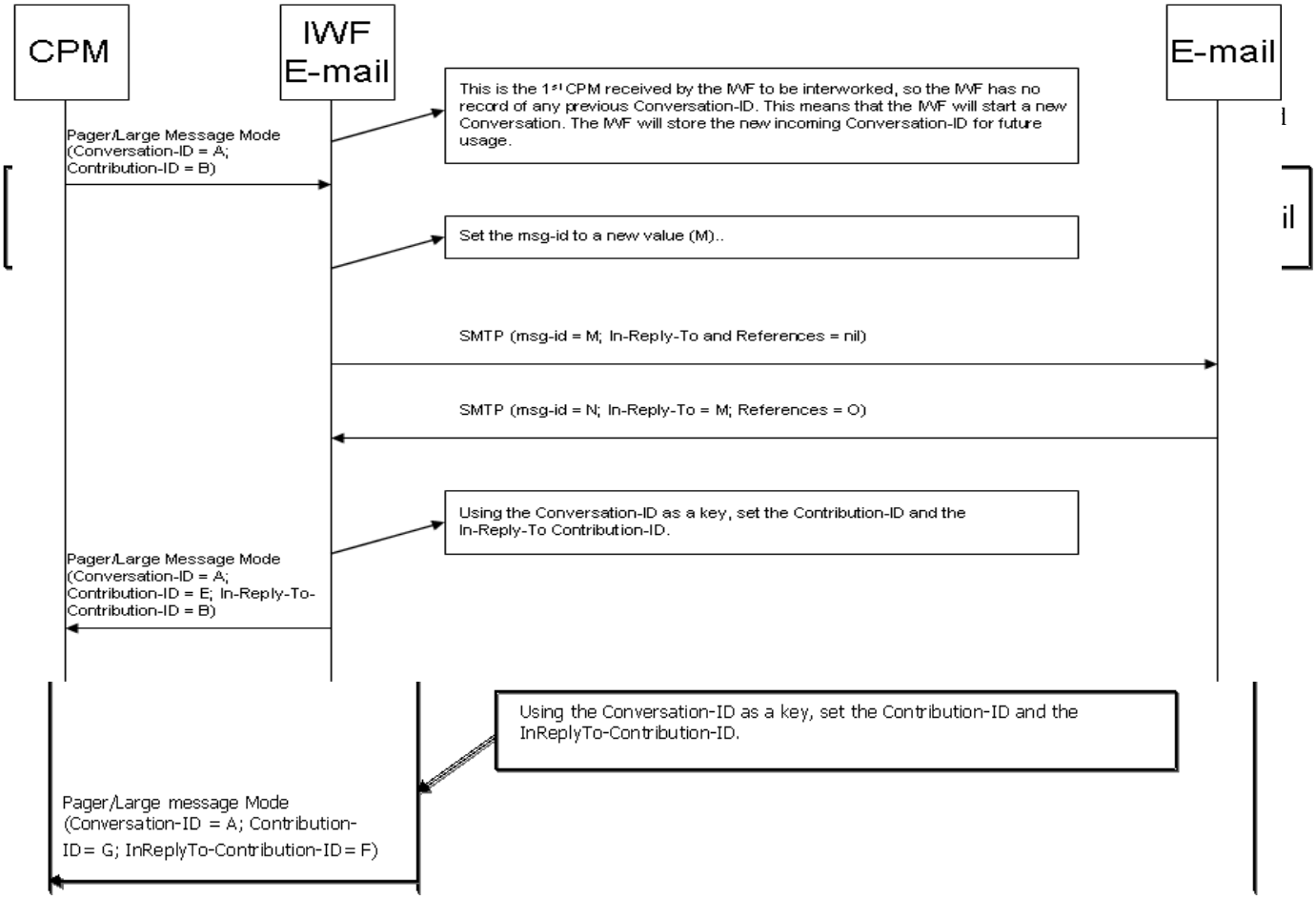
E.2.2 CPM to e-mail parameters mapping

The figure below shows the mapping to be done by the e-mail/IWF upon receipt of the first CPM Message to be interworked to a new e-mail thread.



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Appendix F. Calculation of the Message-Correlator for SMS

The correlation value populated by IWF in the Message-Correlator SIP header field SHALL be based on the following field values of the SMS message:

A. To header, for outgoing messages:
   - It SHOULD be the format as taken from the address field defined in [3GPP TS 23.040]. If TON (Type Of Number) indicates “international”, then a “+” is inserted before the number string. If TON indicates “unknown” only the number string is used. If the address is “alphanumeric”, then the address SHALL be encoded to UTF-8 format.

B. From header, for incoming messages:
   - It SHOULD be the format as taken from the address field defined in [3GPP TS 23.040]. If TON indicates “international”, then a “+” is inserted before the number string. If TON indicates “unknown” only the number string is used. If the address is “alphanumeric”, then the address SHALL be encoded to UTF-8 format.

C. the text payload contained in the user data of the short message with up to 160 characters, as defined below:

   NOTE: Characters or data contained in SMS user data information elements (i.e. SMS and EMS control data as well as EMS content data) are not considered for the correlation algorithm.

   a) For messages with no text payload in the SMS user data a Message-Correlator header field with an empty value SHALL be generated.
   b) The text payload of the user data of the short message SHALL be converted from its original encoding (GSM 7 bit default alphabet or UCS2, see [3GPP TS 23.038]) into UTF-8 format.
   c) Any UCS2 (2-byte Universal Character Set) "Null" field (0x0000) SHALL be removed.
   d) UCS2 and GSM 7 bit default alphabet characters "CR" and "LF" and the sequence "CR LF" are all removed
   e) if IWF has no access to the SMS PDU or does not support the used national single or locking shift tables, the correlation of SMS messages using national single and locking shift tables indicated in the user data header Info Element MAY not be fully supported. Therefore IWF sending SMS messages with characters from the national single and locking shift tables shall use UCS2 encoding.
   f) If national single and locking shift tables are used for received messages and IWF supports the indicated national single or locking shift table, it SHALL convert the relevant characters into UTF-8 format;
   g) If IWF does not support the indicated national single or locking shift table then the GSM 7 bit default alphabet and the GSM 7 bit alphabet extension table SHALL be used.
   h) If a <shift> <character> sequence points to an unassigned code point in the GSM 7 bit alphabet extension table then both the shift codes and the unassigned character code SHALL be removed for the purpose of the Message-Correlator header generation.
   i) In case of concatenated SMS messages once the message is reassembled and the above rules have been applied, only the first 160 characters of the message SHALL be used to generate the Message-Correlator header value in accordance with the procedures defined above.
   j) If the resulting string contains only US-ASCII characters (0x20 – 0x7e) it SHALL be taken as the value of the Message-Correlator header.
   k) If the resulting string contains at least one non US-ASCII character, the Message-Correlator header value SHALL be encoded as defined in [RFC2047]. The value SHALL be encoded by the use of the UTF-8 character set (charset = utf-8) and base64 encoding (encoding = b). In this case the client SHOULD use for correlation of messages the "encoded-text" part of the header value.

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Examples of Message-Correlator headers:
the Message-Correlator header of a short message with the text payload:
To your health, my friend
will encoded as follows
Message-Correlator: To your health, my friend
the Message-Correlator header of a short message with the text payload
На здоровье, мой друг
will be encoded as follows
Message-Correlator: =?utf-8?b? 0J3QsCDQt9C00L7RgNC+0LLRjNC1LCDQvNC+0Lkg0LTRgNGD0LM=?=

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