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Mapping Between the Multimedia Messaging Service (MMS) and Internet Mail

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Abstract

The cellular telephone industry has defined a service known as the Multimedia Messaging Service (MMS). This service uses formats and protocols that are similar to, but differ in key ways from, those used in Internet mail.

One important difference between MMS and Internet Mail is that MMS uses headers that start with "X-Mms-" to carry a variety of user agent- and server-related information elements.

This document specifies how to exchange messages between these two services, including mapping information elements as used in MMS X-Mms-* headers as well as delivery and disposition reports, to and from that used in SMTP and Internet message headers.

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1. Introduction

1.1. Scope

This document describes how to exchange messages between Multimedia Messaging Service (MMS) systems (as defined by [3GPP][3GPP2][OMA]) and Internet mail systems (that is, [SMTP] and [Msg-Fmt]). This includes the translation of message formats, message header elements, message delivery reports [DSN-Msg], and message disposition reports [MDN].

The MMS architecture [Stage_2] and specifications [Stage_3] refer to interfaces as reference points named MMx. For example, MM1 is the client-server interface, MM4 is the server-server interface, and MM3 is an interface to "external" or non-MMS systems. The specification in this document can be used for message exchange between any system that uses Internet message formats and protocols and an MMS system; from the perspective of the MMS system, reference point MM3 is used.

This document includes support for voice messages specified by the Voice Profile for Internet Mail [VPIM]. The VPIM specification allows voice messages to be exchanged between voice mail systems using the Internet mail format [Msg-Fmt] and transported via [SMTP]. Thus, the MMS MM3 interface supports the ability to exchange voice messages between an MMS system and a voice mail system. Note that such use is distinct from voice media being part of a user-composed multimedia message.

Note that MM3 can also be used for interworking with "external" (non-MMS) systems other than Internet mail, such as Short Messaging Service (SMS) and access to external mail stores (such as a voice mail system). This specification does not address these other uses or sub-interfaces of MM3; it is only concerned with Internet mail interworking and specifically exchange of messages.

All MM3 Stage 2 [Stage_2] functions are supported except for reply charging and sender address hiding.

1.2. Conventions Used in This Document

The key words "REQUIRED", "MUST", "MUST NOT", "SHOULD", "SHOULD NOT", and "MAY" in this document are to be interpreted as described in "Key Words for Use in RFCs to Indicate Requirement Levels" [KEYWORDS].

1.3. Definitions

Body	The portion of an [SMTP] message's Content following the Header (that is, following the first blank line). The Body may contain structured parts and sub-parts, each of which may have its own Header and Body. The Body contains information intended for the message recipient (human or software).
Content	The portion of an SMTP message that is delivered. The Content consists of a Header and a Body.
Disposition Report Message Disposition Notification	Feedback information to an originator User Agent by a recipient User Agent about handling of an original message. This may include notification that the message was or was not read, was deleted unread, etc.
Envelope	The portion of an SMTP message not included in the Content, that is, not in the Header or in the Body. While some of it may be copied into the Content on delivery, envelope information exists only while the message is in transit, and contains information used by SMTP agents (Mail Transfer Agents (MTAs)).
Gateway	See [SMTP], Section 2.3.8.

Header	The first part of an SMTP message's Content. The Header is separated from the Body by a blank line. The Header consists of Fields (such as "To:"), also known as Header Fields or Headers. The message Header contains information used by User Agents.
Relay/Server	An MMS server. See [Stage_2]. For purposes of this document, an MMS Relay/Server acts as a gateway when it receives or sends messages via Internet mail.
User Agent	An MMS or email user agent.

1.4. Abbreviations

MSA	Message Submission Agent. A server that accepts messages from User Agents and processes them, either delivering them locally or relaying to an MTA. See [Submission].
MTA	Mail Transfer Agent. A server that implements [SMTP].

1.5. Assumptions

It is assumed that the reader is already familiar with the contents of the 3GPP2 MMS Specification Overview [Overview], MMS Stage 1 (requirements) [Stage_1] and Stage 2 (architecture and abstract messages) [Stage_2], and 3GPP/3GPP2 Stage 3 (protocols) [Stage_3] documents. It is also assumed that the reader is familiar with Internet mail, especially RFC 2821 [SMTP] and RFC 2822 [Msg-Fmt].

2. Mapping Between MMS and Internet Mail

This section defines the interworking between MMS Relay/Servers and External Servers using native [SMTP]. That is, information elements are exchanged using standard Internet message [Msg-Fmt] header fields, such as those in [Hdrs], and standard [SMTP] elements.

SMTP and Internet mail extensions are used for features such as delivery reports, message expiration, and discovery of server support for optional features.

2.1. Mapping Specification

2.1.1. MMS to Internet Mail

When sending a message to an Internet mail system, the MMS Relay/Server MUST convert the MM if required, and MUST comply with the requirements of [SMTP].

The MMS Relay/Server SHOULD use the information elements associated with the MM to define the control information (Internet message header fields and SMTP envelope values) needed for the transfer protocol.

Section 2.1.3 lists the mappings between X-Mms-* headers and Internet message header fields and SMTP values.

Delivery and read report MMs SHOULD be converted to standard Internet message report format (multipart/report). In addition to converting Internet Message reports, the MMS Relay/Server MUST generate delivery and read report MMs for received messages as appropriate. See Section 2.1.4 for more information.

2.1.2. Internet Mail to MMS

When receiving a message from an Internet mail system, the MMS Relay/Server converts incoming messages to the MM format used within the receiving system.

The MMS Relay/Server converts control information received from the Internet mail server into appropriate information elements of an MM.

Section 2.1.3 lists the mappings between X-Mms-* headers and Internet message header fields and SMTP values.

Standard Internet message report format (multipart/report) messages MAY be converted to delivery or read report MMs, as appropriate. In addition to converting report MMs, implementations conforming to this document MUST generate standard Internet message delivery and disposition reports for received Internet messages as appropriate. See Section 2.1.4 for more information.

2.1.3. MMS Information Element Mappings

The mappings between MMS elements and SMTP/Internet message elements ([SMTP] parameters, [Msg-Fmt] headers, and [DSN-Msg] fields) are summarized in table 1 below, and detailed in subsequent sections. The "MMS Headers" are from [OMA-MMS]. Note that only information elements that need to be mapped are listed. [Msg-Fmt] headers not listed here SHOULD be passed unaltered.

2.1.3.1. Table 1: Information Element Mappings

Information Elem	[SMTP] Element	[Msg-Fmt] Header	MMS Header
3GPP MMS Version	N/A	N/A	X-Mms-3GPP-MMS-Version:
Message Type (of PDU)	N/A	N/A	X-Mms-Message-Type:
Transaction ID	N/A	N/A	X-Mms-Transaction-Id:
Message ID	N/A	Message-ID:	Message-ID:
Recipient address(es)	RCPT TO address(es)	To:, Cc:, or omitted (Bcc)	To:, Cc:, Bcc:
Sender’s address	MAIL FROM address if user-originated; MUST set MAIL FROM to null ("<>") for all automatically-generated MMs	From:	From:
Content type	N/A	Content-Type: For voice messages compliant to [VPIM], see Note 2	Content-type:

Information Elem	[SMTP] Element	[Msg-Fmt] Header	MMS Header
Message class	Class=auto: MUST set MAIL FROM to null ("<>").	MAY set 'Precedence: bulk' on class=auto	X-Mms-Message-Class:
Date and time of submission	N/A	Date:	Date:
Time of expiry	DELIVER-BY [Deliver-By]	N/A	X-Mms-Expiry:
Earliest delivery time	(only for submission; not relay)	N/A	X-Mms-Delivery-Time:
Delivery report request	DSN [DSN-SMTP] SHOULD also specify recipient address as ORCPT; SHOULD also specify ENVID	N/A	X-Mms-Delivery-Report:
Importance (a/k/a "priority")	N/A	Importance:	X-Mms-Priority:
Sender visibility	(not currently supported)	(not currently supported)	X-Mms-Sender-Visibility:
Read reply request	N/A	Disposition-Notification-To: [MDN]	X-Mms-Read-Reply:
Reply-charging permission	(not currently supported)	(not currently supported)	X-Mms-Reply-Charging:
Reply-charging permission deadline	(not currently supported)	(not currently supported)	X-Mms-Reply-Charging-Deadline:
Reply-charging permission limitation	(not currently supported)	(not currently supported)	X-Mms-Reply-Charging-Size:

Information Elem	[SMTP] Element	[Msg-Fmt] Header	MMS Header
Reply charging usage request	(not currently supported)	(not currently supported)	X-Mms-Reply-Charging-Id:
Reply charging usage reference	(not currently supported)	(not currently supported)	X-Mms-Reply-Charging:
Subject	N/A	Subject:	Subject:
Previously-sent by	N/A	Resent-From:	X-Mms-Previously-Sent-By:
Previously-sent date	N/A	Resent-Date:	X-Mms-Previously-Sent-Date-and-Time:
Hop/host trace	N/A	Received:	(Not supported)
Sensitivity	N/A	Sensitivity: see Note 1	N/A
Content	N/A	<message body>	<message body>

Note 1: The [VPIM] 'Sensitivity' header element indicates the privacy requested by the message originator (values are "personal" or "private"); per [VPIM], a message recipient MUST NOT forward a message with a 'Sensitivity' header. Since sensitivity is not an MMS feature, any messages that contain a 'Sensitivity:' header SHOULD NOT be sent to an MMS system.

Note 2: [VPIM] specifies how conforming messages are identified.

2.1.3.2. Conversion of Messages from MMS to Internet Format

3GPP MMS Version

The 'X-Mms-3GPP-MMS-Version:' header, if present, SHOULD be removed.

Message Type (of PDU)

The 'X-Mms-Message-Type:' header, if present, SHOULD be removed.

Transaction ID

The 'X-Mms-Transaction-Id:' header, if present, SHOULD be removed.

Message ID

The 'Message-Id:' header MUST be retained. If not present, it MUST be created, with a unique value, per [Msg-Fmt].

To facilitate the case where an MMS message traverses the Internet prior to returning to an MMS system, implementations might wish to retain the 'X-Mms-Message-Id:' header. Such systems should be aware that headers that begin with "X-" might be removed during transit through Internet MTAs.

Recipient(s) address

The address of each recipient MUST be transmitted in the [SMTP] envelope as a RCPT TO value. All disclosed recipients SHOULD also appear in a 'To:' or 'Cc:' header. At least one 'To:', 'Cc:', or 'Bcc:' header MUST be present. If none are present, a 'To:' header SHOULD be created using empty group syntax whose name gives an indication to a human reader, for example, 'To: undisclosed-recipients:;'.

The 'To:' header SHOULD NOT appear more than once. The 'Cc:' header SHOULD NOT appear more than once.

Each recipient address MUST obey the length restrictions per [SMTP].

Current Internet Message format requires that only 7-bit US-ASCII characters be present in headers. Non-7-bit characters in an address domain must be encoded with [IDN]. If there are any non-7-bit characters in the local part of an address, the message MUST be rejected. Non-7-bit characters elsewhere in a header MUST be encoded according to [Hdr-Enc].

All recipient addresses in the [SMTP] envelope must be fully-qualified in accordance with [SMTP]. In particular, messages MUST NOT be sent to an Internet mail system with an unqualified E.164 number (i.e., a number with no domain) instead of a fully-qualified domain name.

All addresses in 'To:', 'Cc:', and 'Bcc:' headers MUST be in the form of fully-qualified domains. Unqualified E.164 numbers MUST NOT be used.

Sender address

The address of the message sender SHOULD appear in the 'From:' header.

The address of the message sender for all user-generated messages ('X-Mms-Message-Class: Personal') SHOULD be transmitted in the [SMTP] envelope as the MAIL FROM value.

The return addresses in the [SMTP] envelope must be fully-qualified in accordance with [SMTP]. In particular, messages MUST NOT be sent to an Internet mail system with an E.164 number instead of a fully-qualified domain name. Note that qualified E.164 numbers, that is, those that contain an E.164 number as the local-part of an address that also includes a domain, are acceptable.

The address(es) in the 'From:' header SHOULD be in the form of fully-qualified domains. Unqualified E.164 numbers SHOULD NOT be used.

Because of the risk of mail loops, it is critical that the MAIL FROM be set to null ("<>") for all automatically-generated MMs (such as 'X-Mms-Message-Class: Auto'). The MAIL FROM value MUST be set to null for all automatically-generated messages. This includes reports, "out-of-office" replies, etc.

Current Internet message format requires that only 7-bit US-ASCII characters be present in headers. Non-7-bit characters in an address domain must be encoded with [IDN]. If there are any Non-7-bit characters in the local part of an address, the message MUST be rejected. Non-7-bit characters elsewhere in a header MUST be encoded according to [Hdr-Enc]. Note that it would be possible to define an [SMTP] extension to permit transmission of unencoded 8-bit characters, but in the absence of such an extension [Hdr-Enc] MUST be used.

The sender address MUST obey the length restrictions of [SMTP].

Content type

The 'Content-Type:' header SHOULD be preserved.

Message class

The 'X-Mms-Message-Class:' header MAY be retained in order to provide information on the source of the message. A 'Precedence: bulk' header MAY be inserted for class=auto or class=advertisement. See 'Sender Address' above. (Class=personal and class=informational do not require special handling.)

Time of Expiry

The 'X-Mms-Expiry:' header, if present, SHOULD be removed.

The remaining time until the message is considered expired SHOULD be transmitted in the [SMTP] envelope by using the DELIVER-BY extension with a by-mode of "R", as specified in [Deliver-By].

Note that the [SMTP] DELIVER-BY extension carries time remaining until expiration; each server decrements the value by the amount of time it has possessed the message. The 'X-Mms-Expiry:' header may contain either the absolute time at which the message is considered expired or the relative time until the message is considered expired.

Earliest delivery time

The 'X-Mms-Delivery-Time:' header, if present, SHOULD be removed.

Future delivery is a message submission (e.g., [Submission]), not message relay feature.

Delivery report request

Requests for delivery status notifications (DSNs) SHOULD be transmitted in the [SMTP] envelope by using the DSN extension as specified in [DSN-SMTP] to request "success" or "none" notification (depending on the value of the 'X-Mms-Delivery-Report' header). When the NOTIFY extension is used, the unaltered recipient address SHOULD be transmitted as the ORCPT value.

The 'X-Mms-Delivery-Report:' header, if present, SHOULD be removed.

Importance

The message sender's importance value (also called "priority", although this can be confused with class-of-service values) SHOULD be transmitted using an 'Importance:' header.

Suggested mappings are shown in Table 2:

2.1.3.2.1. Table 2: Importance Mappings (MMS to Internet Message)

'X-Mms-Priority: High'	'Importance: High'
'X-Mms-Priority: Normal'	[omit]
'X-Mms-Priority: Low'	'Importance: Low'

Normal importance messages should omit the 'Importance:' header.

The 'X-Mms-Priority:' header, if present, SHOULD be removed.

Sender visibility

Support for sender address hiding is not currently supported.

A message that contains an 'X-Mms-Sender-Visibility:' header with a value of 'Hide' SHOULD be rejected.

The 'X-Mms-Sender-Visibility:' header, if present, SHOULD be removed.

Read reply request

A request for a read reply SHOULD be transmitted using a 'Disposition-Notification-To:' header as specified in [MDN].

The 'X-Mms-Read-Reply:' header, if present, SHOULD be removed.

Reply charging

Reply charging permission and acceptance are complex issues requiring both user agent and server support. Misapplied reply charging may cause incorrect billing. Until the security issues have been properly addressed, reply charging SHOULD NOT be honored when using this interface.

The 'X-Mms-Reply-Charging:', 'X-Mms-Reply-Charging-Deadline:', 'X-Mms-Reply-Charging-Size:', and 'X-Mms-Reply-Charging-Id:' headers MAY be removed. Messages containing a reply-charging usage request ('X-Mms-Reply-Charging-Id:' and 'X-Mms-Reply-Charging: accepted' or 'X-Mms-Reply-Charging: accepted (text only)' headers) SHOULD be rejected.

Subject

The 'Subject:' header MUST be preserved. The current Internet message format requires that only 7-bit US-ASCII characters be present. Other characters MUST be encoded according to [Hdr-Enc]. Note that it is possible for an [SMTP] extension to be defined that would permit transmission of unencoded 8-bit characters, but in the absence of such an extension, [Hdr-Enc] MUST be used.

Resending

A message may be resent to one or more new recipients. It may be resent more than once, each time new 'Resent-' headers are added at the top of the existing headers. Thus, if more than one series of 'Resent-' headers are present, the original series is the last; the most recent is the first.

Forward counter

An 'X-Mms-Forward-Counter:' header, if present, SHOULD be removed. The 'Resent-Count:' header is NOT RECOMMENDED. Loop control is usually done by counting 'Received' headers, which are more general than 'Resent-' headers.

Previously-Sent Information

MMS lists the resending history of a message in two headers: 'X-Mms-Previously-Sent-By:' and 'X-Mms-Previously-Sent-Date-and-Time:'. 'X-Mms-Previously-Sent-By:' contains a number followed by one or more addresses. 'X-Mms-Previously-Sent-Date-and-Time:' contains a number followed by a date-time. With both headers, the number "0" is used for the entry that corresponds to the original submission of the message, with higher values being used for each subsequent resending. The final (most recent) resending information is in the 'From:' and 'Date:' headers. There is also an 'X-Mms-Forward-Counter:' that indicates how many times the message has been resent.

Any 'X-Mms-Previously-Sent-By:', 'X-Mms-Previously-Sent-Date-and-Time:', and 'X-Mms-Forward-Counter:' headers, if present, SHOULD be removed. The information contained in them SHOULD be translated into [Msg-Fmt] headers as follows:

The 'X-Mms-Previously-Sent-Date-and-Time:' header whose value starts with "0" SHOULD be used to create a 'Date:' header, converting the date and time from HTTP-date [HTTP] to date-time [Msg-Fmt]. The 'X-Mms-Previously-Sent-By:' header whose value starts with "0" SHOULD be used to create a 'From:' header.

A 'To:' header SHOULD be created using list syntax with a value of "unrecoverable-recipients" and no mailboxes.

A 'Message-ID:' header SHOULD be created.

Any 'X-Mms-Previously-Sent-Date-and-Time:' headers whose value starts with "1" or a larger value are mapped to 'Resent-Date:' headers. Any 'X-Mms-Previously-Sent-By:' headers whose value starts with "1" or a larger value are mapped to 'Resent-By:' headers.

The 'From:', 'To:', 'Date:', and 'Message-ID:' headers are mapped to 'Resent-From:', 'Resent-To:', 'Resent-Date:', and 'Resent-Message-ID:' headers in the top-most block of 'Resent-*' headers.

Example:

The MMS message:

```
X-Mms-Forward-Counter: 2
X-Mms-Previously-Sent-Date-and-Time: 0, Fri, 01 Apr 2005 06:02:03 GMT
X-Mms-Previously-Sent-By:   0, General Failure <mfail@example.mil>
X-Mms-Previously-Sent-Date-and-Time: 1, Fri, 01 Apr 2005 08:02:03 GMT
X-Mms-Previously-Sent-By:   1, Colonel Corn <gcorn@example.mil>
Date:               Fri, 1 Apr 2005 18:02:03 -0800
From:               L. Eva Message <lem@example.org>
To:                 b1ff@mms.example.com
Message-ID:         <99887766.112233@mail.example.org>
```

is mapped to an Internet mail message:

```
Resent-Date: Fri, 1 Apr 2005 18:02:03 -0800
Resent-From: L. Eva Message <lem@example.org>
Resent-To:   b1ff@mms.example.com
Resent-Message-ID:  <99887766.112233@mail.example.org>
Resent-Date: Fri, 1 Apr 2005 08:02:03 +0000
Resent-From: Colonel Corn <gcorn@example.mil>
Date:        Fri, 1 Apr 2005 06:02:03 +0000
From:        General Failure <mfail@example.mil>
To:          Colonel Corn <gcorn@example.mil>
Message-ID:  <000.000.000@gateway.example.org>
```

'Received:' Headers

When a message is gatewayed from MMS to Internet mail, a 'Received:' header MUST be added as per [SMTP]. The "with" clause should specify "MMS".

A message MAY be rejected if the number of 'Received:' headers exceeds a locally-defined maximum, which MUST conform to [SMTP] Section 6.2 and SHOULD be no less than 100.

Privacy

Note that MMS systems do not currently support the 'Privacy' header field as described by [VPIM].

Content

The message content appears in the message body. Note that Internet message format requires that line endings be encoded as US-ASCII CR LF octets; thus, charset encodings that do not have this property cannot be used in text/* body parts. (They may be used in other body parts, but only when they are suitably encoded or when binary transmission has been negotiated, e.g., [BINARY].) In particular, MMS allows UTF-16, whereas the Internet message format does not. UTF-16 encoding MUST be translated to UTF-8 or another charset and encoding that is suitable for use in Internet message format/protocols.

2.1.3.3. Conversion of Messages from Internet to MMS Format

3GPP MMS Version

An 'X-Mms-3GPP-MMS-Version:' header SHOULD be added.

Message Type (of PDU)

An 'X-Mms-Message-Type:' header SHOULD be used in accordance with the specific MMS interface (e.g., MM1, MM4).

Transaction ID

An 'X-Mms-Transaction-Id:' header SHOULD be used in accordance with the specific MMS interface (e.g., MM1, MM4).

Message ID

The 'Message-Id:' header MUST be retained. If not present, it MUST be created, with a unique value.

Recipient(s) address

'To:' and 'Cc:' headers MUST be retained.

Each recipient contained in the [SMTP] envelope (RCPT TO values) MUST be considered a recipient of the message. Recipients who appear in address headers but not the [SMTP] envelope MUST be ignored. Recipients who appear in the [SMTP] envelope but do not appear in headers are considered "blind" (Bcc) recipients; such recipients MUST NOT be added to message headers (including address and trace headers) unless there is only one recipient total.

Sender address

The 'From:' header MUST be retained.

Content type

The complete 'Content-Type:' header (including any parameters) SHOULD be preserved.

Message class

An 'X-Mms-Message-Class: personal' header MAY be created for all received messages with a non-null return path (MAIL FROM value in the SMTP envelope). An 'X-Mms-Message-Class: auto' header MAY be created for messages with a null return path.

Time of Expiry

An 'X-Mms-Expiry:' header SHOULD be created if the message contains a relative time to expiration in the DELIVER-BY extension with a by-mode of "R", as specified in [Deliver-By].

If the by-mode is "N", a "relayed" DSN MUST be issued per [Deliver-By] and an 'X-Mms-Expiry:' header SHOULD NOT be created.

Delivery report request

An 'X-Mms-Delivery-Report:' header SHOULD be created for messages that request 'success' or 'none' delivery status notification by use of the DSN extension as specified in [DSN-SMTP]. Requests for 'delay' notifications or non-default actions, such as that only the message headers should be returned, cannot be mapped onto MMS headers and thus SHOULD be ignored.

Importance

The message sender's importance value (also called "priority", although this can be confused with class-of-service values) is expressed with an 'Importance:' header. Historically, some clients used the older and non-standard 'X-Priority:' header for this purpose. As a result, some clients generate both.

An 'X-Priority:' or 'Importance:' header, if present, SHOULD be replaced with an 'X-Mms-Priority:' header. If both headers are present, 'Importance:' SHOULD be used. Suggested mappings are shown in Table 3:

2.1.3.3.1. Table 3: Priority Mappings (Internet Message to MMS)

'X-Priority: 1 (highest)'	'X-Mms-Priority: High'
'X-Priority: 2 (high)'	'X-Mms-Priority: High'
'Importance: High'	'X-Mms-Priority: High'
'X-Priority: 3 (normal)'	[omitted]
'Importance: Normal'	[omitted]
'X-Priority: 4 (low)'	'X-Mms-Priority: Low'
'Importance: Low'	'X-Mms-Priority: Low'
'X-Priority: 5 (lowest)'	'X-Mms-Priority: Low'

Normal importance messages SHOULD omit the 'X-Mms-Priority:' header.

Sender visibility

Support for sender address hiding is not currently supported.

Read reply request

A request for a read reply contained in a 'Disposition-Notification-To:' header as specified in [MDN] SHOULD be replaced with an 'X-Mms-Read-Reply:' header.

Subject

The 'Subject:' header MUST be preserved.

Resending

Mapping from 'Resent-' and other [Msg-Fmt] headers to 'X-Mms-Previously-Sent-' headers SHOULD be done as follows:

The original 'From:' header is mapped to an 'X-Mms-Previously-Sent-By:' header with a leading "0" value. The value of the top-most 'Resent-From:' header is mapped to the 'From:' header. The value of each subsequent 'Resent-From:' header is mapped to an 'X-Mms-Previously-Sent-By:' header with the next larger leading value.

The original 'Date:' header is mapped to an 'X-Mms-Previously-Sent-Date-and-Time:' header with a leading "0" value. Note that the value is also converted from date-time syntax [Msg-Fmt] to HTTP-date syntax [HTTP]. The value of the top-most 'Resent-Date:' header is mapped to the 'Date:' header. The value of each subsequent 'Date:' header is mapped to an 'X-Mms-Previously-Sent-Date-and-Time:' header with the next larger leading value.

If one or more 'Resent-Message-ID:' headers are present, the top-most one SHOULD be mapped to 'Message-ID:'; otherwise, the 'Message-ID:' header should be retained.

An 'X-Mms-Forward-Counter:' header SHOULD be created when 'Resent-' headers have been mapped to 'X-Mms-Previously-Sent-' headers. Its value SHOULD be the number of 'Resent-' blocks that existed prior to mapping.

Example:

The original message:

```
Date:        Fri, 1 Apr 2005 14:02:03 -0800
From:        General Failure <mfail@example.mil>
To:          Colonel Corn <gcorn@example.mil>
Message-ID:  <msg123@mail.example.mil>
```

Is resent by Colonel Corn to L. Eva Message:

```
Resent-Date: Fri, 1 Apr 2005 16:02:03 -0800
Resent-From: Colonel Corn <gcorn@example.mil>
Resent-To:   L. Eva Message <lem@example.org>
Resent-Message-ID:  <msg234@mail.example.mil>
Date:        Fri, 1 Apr 2005 14:02:03 -0800
From:        General Failure <mfail@example.mil>
To:          Colonel Corn <gcorn@example.mil>
Message-ID:  <msg123@mail.example.mil>
```

L. Eva then resends to her MMS device:

```
Resent-Date: Fri, 1 Apr 2005 18:02:03 -0800
Resent-From: L. Eva Message <lem@example.org>
Resent-To:   b1ff@mms.example.com
Resent-Message-ID:  <99887766.112233@mail.example.org>
Resent-Date: Fri, 1 Apr 2005 16:02:03 -0800
Resent-From: Colonel Corn <gcorn@example.mil>
Resent-To:   L. Eva Message <lem@example.org>
Resent-Message-ID:  <msg234@mail.example.mil>
Date:        Fri, 1 Apr 2005 14:02:03 -0800
From:        General Failure <mfail@example.mil>
To:          Colonel Corn <gcorn@example.mil>
Message-ID:  <msg123@mail.example.mil>
```

This would be mapped to an MMS message as:

```
X-Mms-Forward-Counter: 2
X-Mms-Previously-Sent-Date-and-Time: 0, Fri, 01 Apr 2005 06:02:03 GMT
X-Mms-Previously-Sent-By:   0, General Failure <mfail@example.mil>
X-Mms-Previously-Sent-Date-and-Time: 1, Fri, 01 Apr 2005 08:02:03 GMT
X-Mms-Previously-Sent-By:   1, Colonel Corn <gcorn@example.mil>
Date:               Fri, 1 Apr 2005 18:02:03 -0800
From:               L. Eva Message <lem@example.org>
To:                 b1ff@mms.example.com
Message-ID:         <99887766.112233@mail.example.org>
```

Note that the original 'From:' and 'Date:' values were moved to 'X-Mms-Previously-Sent-By:' and 'X-Mms-Previously-Sent-Date-and-Time:' headers with a leading "0" value. The first 'Resent-From:' and 'Resent-Date:' values were moved to a second set of 'X-Mms-Previously-Sent-' headers, with a leading "1" value. The third set of 'Resent-' headers were moved to the 'Date:', 'To:', and 'From:' headers.

Note also that the format of the date and time differs between the 'Date:' / 'Resent-Date:' and the 'X-Mms-Previously-Sent-Date-and-Time:' headers, in that the latter use HTTP-date [HTTP] instead of date-time [Msg-Fmt].

'Received:' Headers

Each system that processes a message SHOULD add a 'Received:' header as per [SMTP]. A message MAY be rejected if the number of 'Received:' headers exceeds a locally-defined maximum, which MUST conform to [SMTP] Section 6.2 and SHOULD be no less than 100.

Sensitivity

The 'Sensitivity:' header field (value = "personal" or "private") [VPIM] indicates the desire of a voice message originator to send the message contents to the original recipient list with assurance that the message will not be forwarded further by either the messaging system or the actual message recipient(s). Since sensitivity is not an MMS feature, any messages that contain a 'Sensitivity:' header MUST NOT be sent to an MMS system. The associated negative delivery status report MUST include the extended status code [RESP] 5.6.0 as specified in [VPIM] ("Other or undefined protocol status") indicating that privacy could not be ensured.

Content

The message content appears in the message body.

2.1.4. Report Generation and Conversion

Internet message systems use the multipart/report MIME type for delivery and disposition reports as specified in [Report-Fmt]. This format is a two- or three-part MIME message; one part is a structured format describing the event being reported in an easy-to-parse format. Specific reports have a format that is built on [Report-Fmt]. Delivery reports are specified in [DSN-Msg]. Message disposition reports, which include read reports, are specified in [MDN].

By contrast, MMS reports are plain text, with no defined structure specified. This makes it difficult to convert from an MMS report to a standard Internet report.

An implementation conforming to this specification MUST convert reports received from one side (MMS or Internet mail) destined for the other. In addition, reports MUST be generated as appropriate for messages received from either side. For example, if an MM to be sent via Internet mail is not deliverable, a delivery status MM shall be generated. Likewise, if an Internet message is received that cannot be further relayed or delivered, a delivery status report [DSN-Msg] MUST be generated.

When creating delivery or disposition reports from MMS reports, the MMS report should be parsed to determine the reported event and time, status, and the headers of the referenced (original) message. These elements, once determined, are used to populate the subparts of the delivery or disposition report. The first subpart is of type text/plain, and contains a human-readable explanation of the event. This text may include a statement that the report was synthesized

based on an MMS report. The second subpart is of type report/delivery-status (for delivery reports) or report/disposition-notification (for disposition reports). This second part contains a structured itemization of the event. The optional third subpart is of type message/rfc822 and includes the headers and optionally the body of the referenced (original) message. Note that, per [DSN-Msg], the 'DSN-Gateway:' field in delivery reports MUST be created.

2.1.4.1. Delivery Report Mapping from MMS to Internet Message

Below, Table 4 maps information elements from MMS delivery reports to the format specified in [DSN-Msg].

2.1.4.1.1. Table 4: Delivery Report Mappings (MMS to Internet Message)

Information Element	MMS Delivery Report Elem	[DSN-Msg] Element
ID of message whose delivery status is being reported	Message-Id:	'Message-ID:' preserved in third subpart of delivery report.
Recipient address of the original message (object of delivery report)	From:	'Final-Recipient' field of the per-recipient section.
Destination address of report	To:	'To:' header field value of top-level.
Date and time the message was handled	Date:	'Date:' header field value of top-level.

Information Element	MMS Delivery Report Elem	[DSN-Msg] Element
Delivery status of original message to each recipient	X-Mms-Status:	Action and Status fields of per-recipient section. The 'Action' field indicates if the message was delivered. For failed delivery, an appropriate 'Status' value shall be included per [DSN-Msg]. The Action field is set to one of the following values: * delivered (used for MMS status values 'retrieved' and 'rejected', depending on 'Status' code). * failed (used for MMS status values 'expired' and 'unreachable') * delayed MAY be used for MMS status value 'deferred' * relayed (used for MMS status value 'indeterminate') * expanded (SHOULD NOT be used)
Status Text		Text in first part (human-readable part).

When an MMS Relay/Server generates a [DSN-Msg] in response to a message received using [SMTP] on MM3:

* Top-level header field 'To:' SHOULD be the [SMTP] return-path of the message whose status is being reported.

* Top-level header field 'From:' SHOULD be the address of the recipient that the delivery-report concerns.

* The first part of the [DSN-Msg] SHOULD include the MM Status Text field that would have been generated for an MM1 delivery-report.

2.1.4.2 Delivery Report Mapping from Internet Message to MMS

Below, Table 5 maps information elements from a delivery report as specified in [DSN-Msg] to the format of an MMS delivery report. Note that a single DSN that reports multiple recipients will result in several MMS delivery reports.

2.1.4.2.1. Table 5: Delivery Report Mappings (Internet Message to MMS)

Information Element	MMS Delivery Report Element	[DSN-Msg] Element
ID of the original message (object of delivery report)	Message-Id:	'Message-ID:' header preserved in third sub-part of report.
Recipient address of the original message (object of delivery report)	From:	If available, the 'Original-Recipient' field of the per-recipient section should be used; otherwise, the 'Final-Recipient' field of the per-recipient section is used.
Destination address of report	To:	'To:' header field value of top-level. Value taken from [SMTP] envelope return-path of message being reported, not its 'From:' header field.
Date and time the message was handled	Date:	'Date:' header field value of top-level.

Information Element	MMS Delivery Report Element	[DSN-Msg] Element
Delivery status of original message	X-Mms-Status: Set to one of the following values: 'retrieved' (used for 'Action' value 'delivered'). 'unreachable' (used for 'Action' value 'failed') 'forwarded' (used for 'Action' value 'relayed') 'deferred' MUST NOT be used (ignore DSNs with 'Action' value 'delayed')	'Action' and 'Status' fields of per-recipient section.
Status Text		Text in first part (human-readable part).

2.1.4.3. Read Report Mapping from MMS to Internet Message

Below, Table 6 maps information elements from MMS read reports to the format specified in [MDN].

2.1.4.3.1. Table 6: Read Report Mappings (MMS to Internet Message)

Information Element	MMS Delivery Report Elem	[MDN] Element
ID of the original message (object of read report)	Message-Id:	'Message-ID:' header preserved in third part of report.
Recipient address of the original message	From:	'Final-Recipient' field.

Information Element	MMS Delivery Report Elem	[MDN] Element
Destination address of report	To:	'To:' header field value of top-level. Value taken from 'Disposition-Notification-To:' header field of message being reported, not its 'From:' header field.
Date and time the message was handled	Date:	'Date:' header field value of top-level.
Disposition of message being reported	X-Mms-Read-Status:	Disposition-field For X-MMS-Read-Status value 'read', use 'disposition-type' value 'displayed'; for X-MMS-Read-Status value 'Deleted without being read', use 'disposition-type' value 'deleted').
Status Text		Text in first part (human-readable part).

When an MMS Relay/Server generates an [MDN] in response to a message received using [SMTP] on MM3:

* Top-level header field 'To:' SHOULD be the value of the 'Disposition-Notification-To:' header field of the message whose disposition is being reported.

* Top-level header field 'From:' SHOULD be the address of the recipient that the read report concerns.

2.1.4.4. Disposition Report Mapping from Internet Message to MMS

Below, Table 7 maps information elements from a disposition report as specified in [MDN] to the format of an MMS read report.

2.1.4.4.1. Table 7: Disposition Report Mappings (Internet Message to MMS)

Information Element	MMS Read Report Element	[MDN] Element
ID of the original message (object of disposition report)	Message-Id:	'Message-ID:' header preserved in third subpart of report.
Recipient address of the original message	From:	'Final-Recipient' field.
Destination address of report	To:	'To:' header field value of top-level. Value taken from 'Disposition-Notification-To:' header field of message being reported, not its 'From:' header field.
Date and time the message was handled	Date:	'Date:' header field value of top-level.
Disposition of message being reported	X-Mms-Read-Status: Set to one of the following values: 'read' (used for disposition-type value 'displayed') 'Deleted without being read' (used for disposition-types 'deleted', 'denied' and 'failed' when action-mode is 'automatic-action')	disposition-field.
Status Text		Text in first part (human-readable part).

2.1.5. Message Delivery

Within Internet mail, when [SMTP] is used and delivery reports are requested [DSN-SMTP], delivery is considered to be acceptance of a message by the final server, that is, the server closest to the recipient. When an MMS Relay/Server receives a message using [SMTP] and a delivery report is requested, the MMS Relay/Server MAY consider the message delivered when it has been sent to the MMS User Agent.

3. Security Considerations

Both MMS and Internet mail have their own set of security risks and considerations. This document specifies how to exchange messages between these two environments, so it is only appropriate to discuss considerations specific to this functionality, not those inherent in either environment.

When a message uses end-to-end security mechanisms such as [PGP] or S/MIME [SMIME], servers MUST be careful not to accidently destroy the integrity of the protected content (for example, by altering any text within the region covered by a signature while mapping between MMS and email). [Mime-Sec-gw] discusses issues with use of such mechanisms in gateways.

Some MMS features contain inherently more risk than others, including reply charging and sender address hiding. Support for these mechanisms is not included in this document.

4. IANA Considerations

IANA has added "MMS" as one of the "WITH protocol types" under its "MAIL Parameters" registry. The description is "Multimedia Messaging Service"; the reference is to this document.

5. Acknowledgements

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