3GPP TSG-T (Terminals) Meeting #15
Jeju Island, Korea, 6 - 8 March, 2002

Tdoc TP-020016

Agenda Item: 5.2.3

Source: T2

Title: "MMS" Change Requests

Document for: Approval

Spec	CR	Rev	Rel	Subject	Cat	Vers-Curr	Vers-New	T2 Tdoc	Workitem
23.140	034		Rel-4	Correction on the SMTP-address encoding	F	4.5.0	4.6.0	T2-020141	MMS
23.140	035		Rel-4	Correction on the MIME Content-Type Message format on MM4	F	4.5.0	4.6.0	T2-020150	MMS
23.140	036		Rel-4	Correction of the Forwarding Feature	F	4.5.0	4.6.0	T2-020154	MMS
23.140	037		Rel-5	Correction on the SMTP-address address encoding	A	5.1.0	5.2.0	T2-020140	MESS5-MMS
23.140	038		Rel-5	Introduction of SMTP service extensions over MM4	B	5.1.0	5.2.0	T2-020144	MESS5-MMS
23.140	039		Rel-5	MM4 forward routing failure	B	5.1.0	5.2.0	T2-020145	MESS5-MMS
23.140	040		Rel-5	Clarification of existing request status codes over MM4	B	5.1.0	5.2.0	T2-020146	MESS5-MMS
23.140	041		Rel-5	Delivery report definition correction	F	5.1.0	5.2.0	T2-020148	MESS5-MMS
23.140	042		Rel-5	VASP abbreviation	F	5.1.0	5.2.0	T2-020149	MESS5-MMS
23.140	043		Rel-5	Correction on the MIME Content-Type Message format on MM4	A	5.1.0	5.2.0	T2-020151	MESS5-MMS
23.140	044		Rel-5	Correction of addressing on MM1_Submit.REQ	F	5.1.0	5.2.0	T2-020155	MESS5-MMS
23.140	045		Rel-5	Correction of the Forwarding Feature	A	5.1.0	5.2.0	T2-020156	MESS5-MMS
23.140	046		Rel-5	Detection of duplicate MMs	F	5.1.0	5.2.0	T2-020157	MESS5-MMS
23.140	047		Rel-5	Submission Description Enhancement regarding the IE “Date and Time”	F	5.1.0	5.2.0	T2-020158	MESS5-MMS
23.140	048		Rel-5	Adding a reference to 3GPP TS 32.235	F	5.1.0	5.2.0	T2-020161	MESS5-MMS
23.140	049		Rel-5	Terminal Capability Negotiation	B	5.1.0	5.2.0	T2-020162	MESS5-MMS
23.140	050		Rel-5	Recipient MSISDN address resolution	B	5.1.0	5.2.0	T2-020211	MESS5-MMS
23.140	051		Rel-5	Reply-charging bug fixes	F	5.1.0	5.2.0	T2-020215	MESS5-MMS
23.140	052		Rel-5	Support of Reply-Charging in MM7	B	5.1.0	5.2.0	T2-020219	MESS5-MMS
23.140	053		Rel-5	VASP-related CDR generation	B	5.1.0	5.2.0	T2-020261	MESS5-MMS
23.140	054		Rel-5	Persistent Networked-Based Storage Functions	B	5.1.0	5.2.0	T2-020262	MESS5-MMS
23.140	055		Rel-5	Functional Description and Abstract Messages for MM7 realization	B	5.1.0	5.2.0	T2-020263	MESS5-MMS
23.140	056		Rel-5	MMS UA behaviour with respect to handling MMS parameters on the USIM	B	5.1.0	5.2.0	T2-020265	MESS5-MMS
23.140	057		Rel-5	MM1 <-> MM4 header mapping	B	5.1.0	5.2.0	T2-020270	MESS5-MMS
23.140	058		Rel-5	Editorial changes	D	5.1.0	5.2.0	T2-020271	MESS5-MMS
23.140	059		Rel-5	Correction to Call Data Records definitions	F	5.1.0	5.2.0	T2-020272	MESS5-MMS
23.140	060		Rel-5	MM1 addressing formats	C	5.1.0	5.2.0	T2-020297	MESS5-MMS
23.140	061		Rel-5	Reference point MM8 to billing system	B	5.1.0	5.2.0	T2-020275	MESS5-MMS
23.140	062		Rel-5	MM7 Addressing	B	5.1.0	5.2.0	T2-020277	MESS5-MMS
23.140	063		Rel-5	Clarification about Streaming in MMS	F	5.1.0	5.2.0	T2-020278	MESS5-MMS

23.140	064		Rel-5	Clarifications on responsibilities of MMS User Agent and MMS Relay/Server	F	5.1.0	5.2.0	T2-020279	MESS5-MMS

3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020141

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **034** ⌘ **rev** **-** ⌘ Current version: **4.5.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Correction on the SMTP-address address encoding
Source:	⌘	T2
Work item code:	⌘	MMS
Date:	⌘	January 12th, 2002
Category:	⌘	**F**
Release:	⌘	REL-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	This CR corrects the SMTP-address encoding according to the RFC 2822.
Summary of change:	⌘	The current specification omits to include the '<' and '>' characters in the SMTP-address as it is described in RFC 2822. This CR corrects this omission.
Consequences if not approved:	⌘	The specification will contain inaccuracies related to the SMTP-address encoding.

Clauses affected:	⌘	8.4.5.1
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at:
http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.4.5 Message Transfer Protocol on MM4

Interworking between different MMSEs shall be based on SMTP according to STD 10 [22] as depicted in figure 5.

The originator MMS Relay/Server should use an SMTP connection to transfer MMs/abstract messages. The originator MMS Relay/Server should use the sender's address as indicated in the corresponding MM/abstract message in the SMTP "MAIL FROM:" command (subject to the sender's visibility) and should use the recipient's address(es) as indicated in the corresponding MM/abstract message in the SMTP "RCPT TO:" command. The originator MMS Relay/Server should use SMTP "DATA" command to transfer the message.

Private agreements may utilise additional connection and security (e.g. IPSec) methods. Such methods are out of the scope of standardisation for this release.

8.4.5.1 Address Encoding

In the case where E.164 addressing is used and the address resolution returns the domain of the recipient MMSE, the addresses shall be encoded in the following way:

SMTP protocol level:

```
SMTP-address = "<" MMS-address "@" domain ">"
MMS-address = "+" E.164 "/TYPE=PLMN"
E.164 = 1*DIGIT
domain = dom-fragment *( "." dom-fragment )
dom-fragment = ( ALPHA | DIGIT ) *( ALPHA | DIGIT | "-" )
```

Example:

If the originator's address was an E.164 address, the address fields used in RCPT shall be converted to the following format by the sender's MMS Relay/Server:

+E.164/TYPE=PLMN@recipient-mmse

where recipient-mmse is a FQDN of the recipient's MMS Relay/Server, e.g.

+358401234567/TYPE=PLMN@mmse.sonera.net

SMTP commands:

SMTP commands should be then used in the following way:

```
MAIL FROM: SMTP-address
RCPT TO: SMTP-address
DATA
X-MMS-3GPP-MMS-version: 4.2.0
X-MMS-Message-Type: MM4_forward.REQ
X-MMS-Transaction-ID: “ABCDEFGHIJ0123456789”
X-MMS-Message-ID: “originator-mmse/originator-username/123456789”
Date: Wed, 16 May 2001 10:35:00 +0800
From: MMS-address
To: MMS-address
Subject: Greetings from Greece
```

```
Content-Type: text/plain

Hi, …
.
```

NOTE: In the example above the "X-MMS-3GPP-MMS-version" header may not refer to the current version of the present document.

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T2-020279

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **064** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network **X**

Title:	⌘	Clarifications on responsibilities of MMS User Agent and MMS Relay/Server
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	14.02.2002
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	The indication of the responsibilities of MMS User Agents and MMS Relay/Servers is ambiguous in some cases.
Summary of change:	⌘	Clarifications on responsibilities of MMS User Agent and MMS Relay/Server.
Consequences if not approved:	⌘	Some of the responsibilities of MMS User Agent and MMS Relay/Server would still be ambiguous.

Clauses affected:	⌘	4.3, 5.2, 7.1.1, 7.1.3, 7.1.4, 7.1.5, 7.1.6, 7.1.10, 7.2.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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4.3 Addressing

MMS shall support the use of E-Mail addresses (RFC 822) [5] or MSISDN (E.164) or both to address the recipient of an MM. MMS may support the use of service provider specific addresses to address the recipient of an MM. In the case of E-Mail addresses standard internet message routing should be used.

The usage of MSISDN for addressing a recipient in a different MMS service provider's domain shall be possible. For that the need of MSISDN translation to a routable address has been identified. Service provider specific addresses may be used to e.g. deliver messages to MMS VAS Application within one MMSE.

MMS connectivity across different networks (MMSEs) is provided based on Internet protocols. According to this approach, each MMSE should be assigned a unique domain name (e.g. mms.operatora.net).

MMS recipient addresses provided by an MMS User Agent may be in a format of an RFC 822 routable address, e.g. E-Mail address, or other formats, such as E.164 or service provider specific addresses. In those cases where a non-routable address is used to specify a recipient and the recipient belongs to another MMSE or the recipient is outside of any MMSE, it is required to translate the address to an RFC 822 routable address format. ~~It is t~~The sender MMS Relay/Server's ~~responsibility to~~ shall make this mapping before routing forward the message to the recipient's MMS Relay/Server.

The mapping to the correct recipient's MMS Relay/Server domain name is left for standardisation in future releases. It is expected that ENUM (an IETF global numbering proposal) will be used in future releases as the mechanism to map MSISDN numbers to RFC 822 routable addresses. In the mean time, it is expected that MMS service providers or network operators may use solutions for their particular needs which may include static tables or other look-up methods.

MMS shall support address hiding i.e. anonymous messages where the sender's address is not shown to the recipient MMS User Agent. If the peer entity is not known to be an MMS Relay/Server the originator MMS Relay/Server shall not provide the originator address. If the peer entity is known to be an MMS Relay/Server, both the originator address and request of address hiding shall be forwarded to the recipient MMS Relay/Server. The recipient MMS Relay/Server ~~is responsible~~ shall not ~~to~~ show the originator address to the recipient MMS User Agent.

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5.2 MMS Relay/Server

The MMS Relay/Server is responsible for storage and notification, reports, and general handling of messages. The MMS Relay/Server may also provide convergence functionality between External Servers and MMS User Agents and thus enable the integration of different server types across different networks. An Example can be found in Annex A.

It is possible to separate the MMS Relay/Server element into MMS Relay and MMS Server elements, but an allocation of the MMS Relay/Server functionalities to such elements is not defined in this release.

~~The MMS Relay/Server is responsible for the following functions:~~

The MMS Relay/Server shall provide the following functionalities:-

- receiving and sending MM;

~~- enabling/disabling MMS function;~~

~~- personalising MMS based on user profile information;~~

~~- MM deletion based on user profile or filtering information;~~

~~- media type conversion;~~

~~- media format conversion;~~

- conversion of messages arriving at the recipient MMS Relay/Server from legacy messaging systems to MM format (e.g. facsimile to MM) if interworking with legacy messaging systems (MM3) is supported
- conversion of MMs leaving the originator MMS Relay/Server to legacy messaging systems to the appropriate message format (e.g. MM to internet email) if interworking with legacy messaging systems (MM3) is supported
- message content retrieval;

~~- MM forwarding;~~

~~- screening of MM;~~

~~- negotiation of terminal capabilities;~~

~~- checking terminal availability;~~

- MM notification to the MMS User Agent;
- generating delivery reports;
- routing forward MMs and read-reply reports;

~~- generating call data records (CDR);~~

- address translation.

~~- address hiding~~

~~- managing the message properties on servers (e.g. voicemail or email server) integrated in the MMSE (consistency)~~

- temporary ~~and/or persistent~~ storage of messages
- ensuring that messages are not lost until successfully delivered to another MMSE element

~~- controlling the reply charging feature of MMS~~

The MMS Relay/Server should provide additional functionalities such as:-

- generating charging data records (CDR);
- negotiation of terminal capabilities;

The MMS Relay/Server may provide additional functionalities such as:-

- MM forwarding;
- address hiding
- persistent storage of messages
- controlling the reply-charging feature of MMS

The MMS Relay/Server can provide additional functionalities which are not further specified in this release such as:-

- enabling/disabling MMS function;
- personalising MMS based on user profile information;
- MM deletion based on user profile or filtering information;
- media type conversion;
- media format conversion;
- screening of MM;
- checking terminal availability;

- managing the message properties on servers (e.g. voicemail or email server) integrated in the MMSE (consistency) (only applicable if interworking with legacy messaging systems (MM3) is supported)

This list of additional optional functionalities of the MMS Relay/Server is not exhaustive.

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7 MMS Service Behaviour Description

7.1 MMS services offered

7.1.1 Submission of a Multimedia Message in the originator MMSE

When a user intends to send an MM to one or several destinations the MM shall be submitted to the originator MMS Relay/Server.

The support for submission of MMs is optional for MMS User Agents. The support for submission of MMs is mandatory for MMS Relay/Servers.

If an MMS User Agent supports submission of MMs the MMS User Agent shall be able to:

- Indicate the address of the MM recipient
- Identify the MIME content type of the message.

If a MMS User Agent supports submission of MMs the MMS User Agent may be able to:

- Request a delivery report for the message
- Request a read-reply report for the message
- Provide a time stamp for the time of submission of the message
- Set the earliest desired time of delivery for the message
- Set the desired time of expiry for the message
- Indicate the address of the MM originator
- Set further message qualifications (e.g. priority, message class, subject)
- Request the MM originator's address being hidden from the recipient MMS User Agent.

Upon reception of an MM from an originator MMS User Agent the originator MMS Relay/Server

- shall assign a Message Identification to the MM and immediately provide the originator MMS User Agent with this Message Identification
- ~~is responsible for~~ shall retain~~ing~~ the MM until the earliest desired time of delivery, if the optional feature of earliest time of delivery is supported by the originator MMS Relay/Server. If this feature is not supported then the MM is immediately routed forward.
- may provide a time stamp, i.e. it may also override the MMS User Agent's time stamp,
- shall insert the originator's address into the MM if not yet provided by the originator MMS User Agent
- shall pass the originator's address to the peer entity if the peer entity is known to be a MMS Relay/Server
- shall route forward the request for address hiding unaltered to the recipient MMS Relay/Server if the peer entity is known to be an MMS Relay/Server .

- shall pass the originator's address to the peer entity if the peer entity is not known to be an MMS Relay/Server and address hiding has not been requested by the originator MMS User Agent
- shall not pass the originator's address to the peer entity and should override the address provided by the originator MMS User Agent in the MM to an "anonymous" address if the peer entity is not known to be an MMS Relay/Server and address hiding has been requested by the originator MMS User Agent
- may override the address provided by the originator MMS User Agent in the MM (subject to MMS service provider's preferences)
- ~~is responsible for~~ shall resolve~~ing~~ the MM recipient's address(es),
- ~~is responsible to~~ shall route the MM towards the MM recipients.
- should pass the indication whether or not a delivery report is requested unaltered when routing the MM towards the MM recipient(s)
- shall pass the indication whether or not a read-reply report is requested unaltered when routing the MM towards the MM recipient(s)
- shall pass the indication about MIME content type of the message and message qualifications (e.g. priority, message class, subject) unaltered when routing the MM towards the MM recipient(s)
- shall generate a delivery report indicating "indeterminate" status of the MM's delivery if a delivery report was requested by the originator MMS User Agent and if the peer entity the MM is routed forward to is not known by the originator MMS Relay/Server.

A special case is where the recipient MMS Relay/Server is also the originator MMS Relay/Server. In this case the MM does not have to be routed forward.

7.1.2 Reception of a Multimedia Message in the recipient MMSE

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7.1.3 Retrieval of a Multimedia Message in the recipient MMSE

The recipient MMS User Agent shall be able to request delivery of an MM from the recipient MMS Relay/Server based on the information received in the notification.

Upon delivery request the recipient MMS Relay/Server

- shall deliver the MM to the recipient MMS User Agent
- may perform data adaptation based on user profile and/or MMS User Agent capabilities
- shall not provide the MM originator address to the MM recipient if the originator MMS User Agent requested its address to be hidden from the MM recipient
- shall provide the MM originator address to the MM recipient if the originator MMS User Agent did not request its address to be hidden from the MM recipient and if the MM originator address is available at the recipient MMS Relay/Server
- may provide an alias or clarifying text (e.g. "anonymous address" or "unknown address") in the originator address field instead of providing the originator address to the recipient MMS User Agent, if the originator has requested address hiding or the original message does not contain the originator address
- shall give an indication to the recipient MMS User Agent that a delivery report is requested if such a delivery report has been requested by the originator MMS User Agent
- shall give an indication to the recipient MMS User Agent that a read-reply report is requested if such a read reply report has been requested by the originator MMS User Agent

- shall indicate the MIME content type of the MM to the recipient MMS User Agent
- shall provide other available message qualifications unaltered to the recipient MMS User Agent
- shall provide the time stamp of the MM unaltered to the recipient MMS User Agent
- shall ~~be responsible for the~~ storage ~~of~~ messages in the network until the recipient MMS User Agent becomes reachable (e.g. user moves back into coverage, switches MMS User Agent on) or until the MM expires.
- should provide the recipient MMS User Agent with a list of addresses of forwarding MMS User Agents for the MM if the MM was forwarded and the address information is available to the recipient MMS Relay/Server.

In a response to an MM's delivery the recipient MMS User Agent may be able to

- request a delivery report not to be generated by the MMS Relay/Server.

7.1.4 Forwarding of a Multimedia Message without prior Retrieval

This part of the MMS service describes the mechanism by which an MMS User Agent may request the corresponding MMS Relay/Server, that an MM for which the MMS User Agent is the intended recipient (and is notified of the MM) be forwarded to other specified recipient(s) MMS User Agent(s) whose address(es) shall be specified by the forwarding MMS User Agent, without having to first retrieve the MM.

The support for originating a request that a specific MM be forwarded is optional for the MMS User Agent.

The support for forwarding an MM, in response to a request from a MMS User Agent that a specific MM be forwarded is optional for the MMS Relay/Server.

The original MM is forwarded to a new recipient(s) with the forwarding MMS User Agent's address being provided but without additional content, and without affecting the elements of the original MM. Some additional information elements e.g. delivery report, read-reply report, i.e. requests for reports which are to provide feedback on the forwarded MM to the forwarding MMS User Agent, may be supplied.

MM Element Forwarding, where particular elements of an MM are requested to be forwarded, is left for standardisation in future releases.

If a forwarding MMS User Agent supports requesting MM forwarding the MMS User Agent shall:

- indicate the address of the MM recipient(s).
- provide the message reference provided in the MM Notification.
- not generate a read-reply report to the originator MMS User Agent even if a read-reply report is requested.

If a MMS User Agent supports requesting forwarding of MMs the forwarding MMS User Agent may:

- Indicate the address of the Forwarding MMS User Agent (i.e. it's own address)
- Provide a time stamp for the time of submission of the request to forward the MM
- Set the desired time of expiry for the forwarded MM
- Set the earliest desired time of delivery for the forwarded MM
- Request a delivery report for the forwarded MM
- Request a read-reply report for the forwarded MM

Upon reception of a request from a forwarding MMS User Agent to forward an MM, the forwarding MMS Relay/Server

- shall assign a Message Identification to the forwarded MM and immediately provide the forwarding MMS User Agent with this Message Identification
- shall provide status information on the MM forward request to the forwarding MMS User Agent.

- ~~is responsible for~~ shall retain~~ing~~ the forwarded MM until the earliest desired time of delivery, if the optional feature of earliest time of delivery is supported by the MMS Relay/Server of the forwarding MMS User Agent. If this feature is not supported then the MM is immediately routed forward.
- may provide a time stamp for the forwarded MM, i.e. it may also override the forwarding MMS User Agent's time stamp,
- shall insert the forwarding MMS User Agent's address into the forwarded MM if not yet provided
- may override the address provided by the forwarding MMS User Agent in the forwarded MM (subject to MMS service provider's preferences)
- ~~is responsible for~~ shall resolve~~ing~~ the recipient's address(es) of the forwarded MM,
- ~~is responsible to~~ shall route the forwarded MM towards the MM recipients.
- shall pass the indication whether or not a delivery report is requested unaltered when routing the forwarded MM towards the MM recipients.
- shall pass the indication whether or not a read-reply report is requested unaltered when routing the forwarded MM towards the MM recipient(s)
- shall generate a delivery report indicating "indeterminate" status of the MM's delivery if a delivery report was requested by the forwarding MMS User Agent and if the peer entity the MM is routed forward to is not known to the MMS Relay/Server of the forwarding MMS User Agent.
- shall provide the recipient(s) MMS Relay/Server with a count of the number of times that the particular MM was forwarded.
- shall provide the recipient(s) MMS Relay/Server with a list of addresses of forwarding MMS User Agents for the MM.
- shall generate a delivery report to the originator MMS User Agent if a delivery report is requested.

A special case is where the recipient MMS Relay/Server is also the forwarding MMS Relay/Server. In this case the MM does not have to be routed forward.

7.1.5 Delivery Report

The MMS Relay/Server shall support the delivery reporting service. Delivery reports shall only be generated for MMs.

The originator MMS User Agent may be able to request a delivery report for a specific MM.

Within an MM notification or upon MM retrieval the recipient MMS User Agent may receive an indication that a delivery report is requested for the MM.

Within either a response to a notification or a response to an MM's delivery, the recipient MMS User Agent may request a delivery report not to be generated by the MMS Relay/Server.

The originator MMS Relay/Server shall generate a delivery report if a delivery report has been requested by the originator MMS User Agent

- upon routing forward the MM, in case the peer entity is not known by the MMS Relay/Server

The recipient MMS Relay/Server shall generate a delivery report if a delivery report has been requested by the originator MMS User Agent and if the recipient MMS User Agent did not request a delivery report not to be generated

- upon receipt of a response to a notification, in case the MM is rejected by the recipient MMS User Agent
- upon receipt of a forwarding request, in case the MM is forwarded by the recipient MMS User Agent to other MM recipient(s), without prior retrieval.
- upon receipt of a response to an MM's delivery, in case the MM is retrieved by the MM recipient

- upon expiry of the MM, in case the MM is not rejected and not retrieved by the MM recipient before the expiry

The originator MMS User Agent, i.e. the MMS User Agent receiving the delivery report, may match the delivery report to the sent MM by retaining the message identification of the sent MM and comparing it to the received delivery report, which shall contain the message identification of the original MM. In case of multiple MM recipients, it is necessary for the originator MMS User Agent to retain the MM recipient addresses as well, to match the delivery report to the sent MM.

If a delivery report has been requested by the originator MMS User Agent and if the recipient MMS User Agent did not request a delivery report not to be generated, the recipient MMS Relay/Server

- shall generate the delivery report
- shall deliver the delivery report to the originator MMS Relay/Server.
- shall ~~be responsible for the~~ storage ~~of~~ delivery reports in the network until the originator MMS Relay/Server becomes reachable or until the delivery report expires

Within the delivery report the recipient MMS Relay/Server

- shall provide the MM originator address to the originator MMS Relay/Server.
- shall provide the MM recipient address to the originator MMS Relay/Server.
- shall provide the identification of the original MM for which the delivery report has been generated to the originator MMS Relay/Server.
- shall provide status information how the MM was handled (e.g. expired, rejected, delivered, forwarded or indeterminate) to the originator MMS Relay/Server
- shall provide a time stamp when the MM was handled to the originator MMS Relay/Server

For each MM recipient of the original MM for which the delivery report has been generated and becomes available at the originator MMS Relay/Server, the originator MMS Relay/Server

- shall deliver the delivery report to the originator MMS User Agent (i.e. the recipient MMS User Agent of the delivery report).

Within the delivery report the originator MMS Relay/Server

- shall provide the MM recipient's address to the originator MMS User Agent (the recipient MMS User Agent of the delivery report).
- shall provide the identification of the original MM for which the delivery report has been generated to the originator MMS User Agent (the recipient MMS User Agent of the delivery report).
- shall ~~be responsible for the~~ storage ~~of~~ delivery reports in the network until the originator MMS User Agent becomes reachable (e.g. user moves back into coverage, switches MMS User Agent on) or until the delivery report expires

7.1.6 Read-Reply Report

The MMS Relay/Server shall support the read-reply reporting service. Read-reply reports shall only be generated for MMs.

Upon MM submission the originator MMS User Agent may be able to request a read-reply report for a specific MM.

Upon MM retrieval the recipient MMS User Agent may receive an indication that a read-reply report is requested for the MM.

After having handled/rendered the MM the recipient MMS User Agent may generate a read-reply report if requested by the originator MMS User Agent and if the originator MMS User Agent address is available.

The originator MMS User Agent, i.e. the MMS User Agent receiving the read-reply report, may match the read-reply report to the sent MM by retaining the message identification of the sent MM and comparing it to the received read-

reply report, which shall contain the message identification of the original MM. In case of multiple MM recipients, it is necessary for the originator MMS User Agent to retain the MM recipient addresses as well as to match the read-reply report to the sent MM.

If a read-reply report has been requested by the originator MMS User Agent and if the recipient MMS User Agent supports the read-reply feature and if the recipient allows its creation the recipient MMS User Agent shall submit the read-reply report to the recipient MMS Relay/Server at the earliest opportunity.

NOTE: Since the MM recipient has the right to deny this service not receiving a read-reply report does not mean the message has not been rendered.

A read-reply report:

- shall contain the MM originator's address
- shall contain the MM recipient's address
- shall contain the message identification of the original MM for which the read-reply report has been generated.
- shall provide status information how the MM was rendered (e.g. read, deleted without being read)
- shall provide a time stamp for when the MM was rendered

The recipient MMS User Agent shall ~~be responsible for the~~ stor~~ag~~e ~~of~~ read-reply reports in the UE until the recipient MMS Relay/Server becomes reachable (subject to support of the read-reply reporting service by the recipient MMS User Agent and storage place being available).

Upon reception of a read-reply report from a recipient MMS User Agent the recipient MMS Relay/Server

- may provide a time stamp for the read-reply report, i.e. it may also override the MMS User Agent's time stamp,
- shall pass the MM originator address unaltered when routing the read-reply report towards the originator MMS User Agent (the recipient MMS User Agent of the read reply report)
- shall insert the MM recipient's address into the read-reply report if not yet provided
- may override the address provided by the recipient MMS User Agent in the read-reply report (subject to MMS service provider's preferences)
- ~~is responsible for~~ shall resolve~~ing~~ the MM originator's address,
- ~~is responsible to~~ shall route the read-reply report towards the originator MMS User Agent of the original MM.

A special case is where the recipient MMS Relay/Server is also the originator MMS Relay/Server. In this case the MM does not have to be routed forward.

7.1.7 Support for Streaming in MMS

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7.1.10 Support for Reply-Charging in MMS

The MMS User Agent may support reply-charging. If the MMS User Agent supports this feature it is expected that the MMS User Agent supports the following behaviour.

The MMS Relay/Server may support reply-charging. If the MMS Relay/Server supports this feature it is expected that the MMS Relay/Server supports the following behaviour.

A User of the MMS may be able to take over the charge for the sending of a reply-MM to their submitted MM from the recipient(s). Therefore the originator of an MM should be able to mark the MM as reply-charged. The originator's MMS

Relay/Server could either accept the user's settings for reply-charging or not and should be able to convey feedback to the originator. It should be possible to take over the charge for reply-MMs from different recipients.

The recipient should be notified if she is not charged for a reply-MM to this particular MM. However, the indication of reply-charging covers only the willingness/fact that a reply-MM to an original MM is free of charge, not that the retrieval of the original MM marked as reply-charged is free of charge. Both the originator and the recipient MMS Relay/Server shall be able to control that not more than one reply-MM per recipient is charged to the originator. The MMS User Agent may indicate to the user if an MM has already been replied to.

The request for reply-charging shall not be passed on to the recipient

- if the recipient is not known to belong to an MMSE peer entity, or
- in the case the MM is forwarded.

NOTE: For this release the following limitations apply: Support for reply-charging in MMS is restricted to MMS User Agents belonging to the same MMSE, i.e. originator and recipient MMSE are identical. Reply-charging allows only one reply-MM per recipient, i.e. reply-charging applies to the first successful submission of an MM sent as a reply. Furthermore, a reply-MM is restricted to text only. These limitations may be elaborated further in future releases.

In addition to the service behaviour described in previous clauses the following behaviour is expected to support reply-charging in MMS.

Within the submission of an MM the MM originator may indicate a willingness to pay the charge for one reply-MM per MM recipient. In this case the originator MMS User Agent:

- shall indicate the sender's willingness to pay the charge for one reply-MM per MM recipient,
- may define a reply-charging limitation request (e.g. may specify the latest time of submission of the reply-MMs or a maximum size of reply-MMs).

In a response to the MM submission the originator MMS Relay/Server shall inform the originator MMS User Agent whether or not it accepts

- the originator's request for reply-charging in the original MM,
- the reply-charging limitations set by the originator MMS User Agent in the original MM.

Upon reception of an MM from an originator MMS User Agent the originator MMS Relay/Server

- may provide reply-charging limitations, i.e. it may also override by further limiting the MMS User Agent's settings for reply-charging limitations,
- shall pass the indication whether or not a reply-MM is requested unaltered when routing the original MM towards the MM recipient(s) if the peer entity is known to be the same MMS Relay/Server,
- shall pass the reply-charging limitations for the reply-MM when routing the original MM towards the MM recipient(s) if the peer entity is known to be the same MMS Relay/Server.

If the MM recipient has requested the original MM to be forwarded to some other address the recipient MMS Relay/Server

- shall not pass any information about the reply-charging request towards the addressee(s) of the forwarding request.

If reply-charging has been requested by the MM originator the recipient MMS Relay/Server

- should inform the recipient MMS User Agent with the MM notification and upon MM delivery that the MM originator is willing to pay for a reply-MM to this original MM.
- may notify the recipient about the reply-charging limitations set by the orginator (e.g. the latest time of submission of a reply-MM to the original MM).

When a user intends to send a reply-MM to the MM originator the recipient MMS User Agent (which is the originator MMS User Agent of the reply-MM):

- shall mark the MM as a reply-MM,
- shall provide the message-ID of the original MM which it replies to (if it is the reply-MM),
- shall submit the reply-MM to the recipient MMS Relay/Server,
- may be able to indicate to the user whether this MM has already been replied to,
- may be able to indicate to the user if the reply-charging limitations can not be met.

Upon submission the recipient MMS Relay/Server

- shall reject the reply-MM submission attempt and should convey this information back to the recipient MMS User Agent if the reply-MM submission attempt does not meet the limitations set by the originator MMS User Agent,
- shall be able to uniquely map the reply-MM to the original MM.

7.2 MMSE Addressing responsibilities

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3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020278

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **063** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☒ Radio Access Network ☐ Core Network ☒

Title:	⌘	Clarification about Streaming in MMS
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	Feb. 14, 2002
Category:	⌘	**F**
Release:	⌘	*REL-5*

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	Support for streaming in MMS requires informative clarification for better understanding of the normative texts on the subject matter.
Summary of change:	⌘	An informative annex is proposed here to clarify the use of streaming in MMS. The annex is referred in corresponding normative part (clause 7.1.7). The word "delivery" is replaced by "retrieval" in clause 7.1.7. Couple of abbreviations (RTSP and SDP) are added in clause 3.2.
Consequences if not approved:	⌘	

Clauses affected:	⌘	3.2, 7.1.7, Annex
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3.2 Abbreviations

For the purposes of the present document, the abbreviations defined in [1] and [2] and the following apply:

CDR	Call Data Record
DNS	Domain Name System
EMA	Electronic Message Association
E-Mail	Electronic Mail
ENUM	Electronic Numbering
FQDN	Fully Qualified Domain Name
GW	Gateway
HTTP	Hypertext Transfer Protocol
IANA	Internet Assigned Numbering Authority
IETF	Internet Engineering Task Force
IMAP4	Internet Message Access Protocol
MIME	Multipurpose Internet Mail Extensions
MM	Multimedia Message
MMS	Multimedia Messaging Service
MMSE	Multimedia Messaging Service Environment
MMSNA	Multimedia Messaging Service Network Architecture
MTA	Mail Transfer Agent
PDU	Protocol Data Unit
POP3	Post Office Protocol Version 3
RADIUS	Remote Authentication Dial In User Service
RDF	Resource Description Format
RFC	Request for Comments
RTSP	Real Time Streaming Protocol
SDP	Session Description Protocol
SMIL	Synchronised Multimedia Integration Language
SMTP	Simple Mail Transfer Protocol
UA	User Agent
UAProf	User Agent Profile
URI	Uniform Resource Identifiers
VAS	Value Added Service
VPIM	Voice Profile for Internet Mail
W3C	WWW Consortium
WAP	Wireless Application Protocol
WIM	WAP Identity Module
WML	Wireless Markup Language
WSP	WAP Session Protocol
WTLS	Wireless Transport Layer Security

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7.1.7 Support for Streaming in MMS

This section defines the service behaviour specific to support for streaming in MMS. The term "According to the normal MMS framework.." indicates those paragraphs which are not specific to streaming but described elsewhere in subclause 7.

MMS supports streaming for the retrieval of MM contents (one or more MM elements). Support for streaming is optional for both the MMS User Agent and the MMS Relay/Server.

The use of streaming for the retrieval of MM contents is independent of the MM submission. The retrieval of MM contents to the recipient MMS User Agent depends on the configuration and the capability of the recipient MMS User Agent and the recipient MMS Relay/Server. MM contents may be either delivered as non-streaming MM elements, or made available for streaming retrieval. The recipient MMS Relay/Server decides whether to use streaming based on the

media type and the media format of the subjected MM contents, capability negotiation and/or user settings/preferences. The recipient MMS Relay/Server may convert media types and/or formats of MM contents to make it available for streaming retrieval. If streaming retrieval is used, the streaming-specific protocols, codecs, presentation, session negotiation and control are according to [40] and [41].

According to the normal MMS framework, the recipient MMS Relay/Server shall generate a notification which contains information to enable the recipient MMS User Agent to request for the ~~delivery~~retrieval of the corresponding MM from the recipient MMS Relay/Server.

Upon ~~delivery~~retrieve request, the recipient MMS Relay/Server shall deliver a modified MM with one or several presentation descriptions as defined in [41], as one or several MM elements, in place of the corresponding streamable MM contents to the recipient MMS User Agent, if it has made the MM contents available for streaming retrieval. The format of the presentation description is as defined in [41]. MIME type of the format of the presentation description shall be used to indicate the content type of the MM elements, which contain the corresponding presentation description. The presentation description carries all required information to initiate the streaming process by the recipient MMS User Agent in order to retrieve the streamable MM content from the media server as defined in [40]. Example of a presentation description is shown in Annex X.

According to the normal MMS framework, the recipient MMS Relay/server shall base the generation of a delivery report on the receipt of a response to the delivery of the modified MM from the recipient MMS User Agent.

After the successful reception of the MM, which includes the presentation description, the recipient MMS User Agent may initiate a streaming process to retrieve the streamable MM contents depending on the information in the presentation description. According to the normal MMS framework, the recipient MMS User Agent may base the generation of a read-reply report either on the rendering/handling of the modified MM, or on the rendering/handling of the streamable MM contents.

Annex X further depicts the streaming transactions after the decision to offer streamable content is made by the recipient MMS Relay/Server.

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Annex X (informative): Support for Streaming in MMS

Figure Y shows an example of the transaction flow for using streaming in MMS for retrieval of streamable MM elements. The MMS Relay/Server sends a modified MM as MM1_retrieve.RES in response to a retrieve request (MM1_retrieve.REQ). The rest of the transactions and the acronyms are as described in [40].

Note: The interface between MMS Relay/Server and Media Server is not specified in this release.

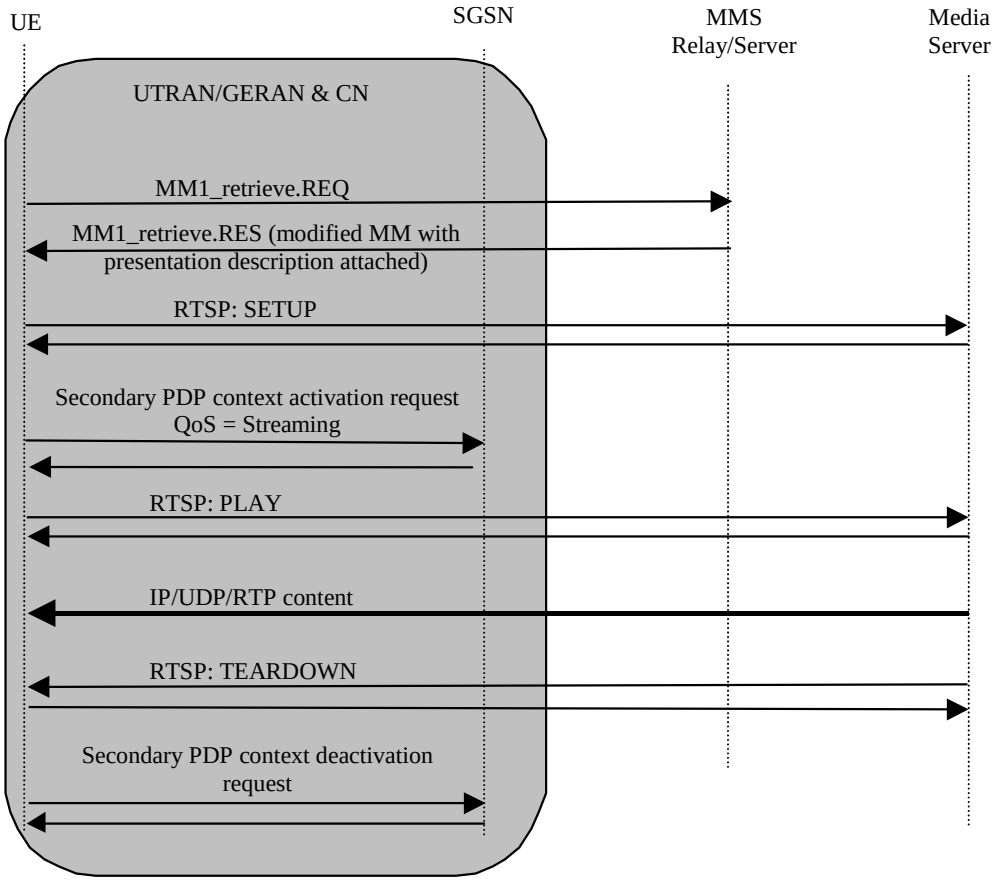

Figure Y: Schematic view of the support for streaming in MMS

SDP is used as the format of the presentation description, as defined in [41]. MIME type for an SDP file is also according to [41]. The attribute line ('a=') with "control" type in the SDP header indicates the need to open an RTSP session. Use of RTSP to set-up and control a streaming session is according to [41].

Following is an example of a presentation description in SDP format. The example describes streaming of a video sequence.

```
v=0
o=ghost 2890844526 2890842807 IN IP4 192.168.10.10
s=MMS Example
i=Example of SDP file for streaming in MMS
u=http://www.infoserver.com/ae600
e=ghost@mailserver.com
c=IN IP4 0.0.0.0
b=AS:128
t=0 0
a=range:npt=0-45.678
m=video 1024 RTP/AVP 96
b=AS:128
a=rtpmap:96 H263-2000/90000
a=fmtp:96 profile=3;level=10
a=control:rtsp;//mediaserver.com/movie
a=recvonly
```

3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020277

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **062** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

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Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	MM7 Addressing
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	February 5th, 2002
Category:	⌘	**B**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	MM7 has defined to be a part of Release 5. Currently addressing section is missing in proposed MM7 stage 2 CR.
Summary of change:	⌘	Added new section 7.2.3 MM7 addressing. Some minor corrections to section 4.3 and 7.2 due to new section 7.2.3. and inclucion of MM7 to 23.140.
Consequences if not approved:	⌘	Unclear specification because MM7 addressing section and address hiding behaviour on MM7 were missing

Clauses affected:	⌘	4.3, 7.1.9, 7.2, 7.2.3
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
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1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3 Definitions and Abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions defined in 3GPP TR 21.905 [2] and 3GPP TS 22.140 [1] and the following apply:

Abstract message: information which is transferred between two MMS entities used to convey an MM and/or associated control information between these two entities

NOTE 1: The application protocol framework and technical realisation of MMS service features is described in terms of abstract messages in the present document.

Delivery Report: feedback information provided to an originator MMS User Agent by an MMS Relay/Server about the status of the delivery of an MM

External Server: network entity/application of an external system such as Internet email, unified messaging system or facsimile to which MMs may be sent to and/or from which MMs may be received by an MMS User Agent via an MMS service provider

NOTE 2: An External Server is connected to that MMS Service Provider via non-MMS-specific protocols.

Forwarding MMS User Agent: MMS User Agent that is the intended recipient of an MM, that requests forwarding of the MM for delivery to other recipient(s) without having to first download the MM

Forwarded MM: MM originally sent from a sender to an intended recipient which is then forwarded to other recipient(s) and to which a delivery report and/or read-reply report may refer and which may be subject to further forwarding

MM Delivery: act of a recipient MMS Relay/Server delivering an MM to a recipient MMS User Agent

MM Submission: act of an originator MMS User Agent submitting an MM to the originator MMS Relay/Server

MMSNA: Multimedia Messaging Service Network Architecture encompasses all the various elements that provide a complete MMS to a user

MMSE: collection of MMS-specific network elements under the control of a single administration

MMS Relay/Server: MMS-specific network entity/application that is under the control of an MMS service provider

NOTE 3: An MMS Relay/Server transfers messages, provides operations of the MMS that are specific to or required by the mobile environment and provides (temporary and/or persistent) storage services to the MMS.

MMS User Agent: application residing on a UE, an MS or an external device that performs MMS-specific operations on a user's behalf

NOTE 4: An MMS User Agent is not considered part of an MMSE.

MMS VAS Applications: Applications providing Value Added Services (e.g. news service or weather forecasts) to MMS users.

Original MM: (initial) MM sent from a sender to a recipient and to which a delivery report and/or a read-reply report and/or a reply-MM may refer and/or which may be subject to being forwarded

Originator MMSE: MMSE associated with the sender of an MM

Originator MMS Relay/Server: MMS Relay/Server associated with the sender of an MM

Originator MMS User Agent: MMS User Agent associated with the sender of an MM

Read-Reply Report: feedback information to an originator MMS User Agent by a recipient MMS User Agent about the status of handling/rendering of an original MM in a recipient MMS User Agent

Recipient MMSE: MMSE associated with the recipient of an MM

Recipient MMS Relay/Server: MMS Relay/Server associated with the recipient of an MM

Recipient MMS User Agent: MMS User Agent associated with the recipient of an MM

Reply-MM: the first reply accepted by the recipient MMS Relay/Server (after checking the reply charging limitations, such as the latest time of submission) in case of reply-charging

Short code: Service provider specific address which is a string of alphanumeric characters.

Transaction: message pair sent between an MMS User Agent and MMS Relay/Server, or between MMS Relay/Servers

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4.3 Addressing

MMS shall support the use of E-Mail addresses (RFC 822) [5] or MSISDN (E.164) or both to address the recipient of an MM. MMS may support the use of service provider specific addresses to address the recipient of an MM. In the case of E-Mail addresses standard internet message routing should be used. MMS may support short codes to address Value Added Services.

Note: The length of short codes shall be defined by the service provider and will not be specified for this release.

The usage of MSISDN for addressing a recipient in a different MMS service provider's domain shall be possible. For that the need of MSISDN translation to a routable address has been identified. Service provider specific addresses may be used to e.g. deliver messages to MMS VAS Application within one MMSE.

MMS connectivity across different networks (MMSEs) is provided based on Internet protocols. According to this approach, each MMSE should be assigned a unique domain name (e.g. mms.operatora.net).

MMS recipient addresses provided by an MMS User Agent may be in a format of an RFC 822 routable address, e.g. E-Mail address, or other formats, such as E.164 or service provider specific addresses. In those cases where a non-routable address is used to specify a recipient and the recipient belongs to another MMSE or the recipient is outside of any MMSE, it is required to translate the address to an RFC 822 routable address format. It is the sender MMS Relay/Server's responsibility to make this mapping before routing forward the message to the recipient's MMS Relay/Server.

The mapping to the correct recipient's MMS Relay/Server domain name is left for standardisation in future releases. It is expected that ENUM (an IETF global numbering proposal) will be used in future releases as the mechanism to map MSISDN numbers to RFC 822 routable addresses. In the mean time, it is expected that MMS service providers or network operators may use solutions for their particular needs which may include static tables or other look-up methods.

MMS shall support address hiding i.e. anonymous messages where the sender's address is not shown to the recipient MMS User Agent. If the peer entity is not known to be an MMS Relay/Server the originator MMS Relay/Server shall not provide the originator address. If the peer entity is known to be an MMS Relay/Server, both the originator address and request of address hiding shall be forwarded to the recipient MMS Relay/Server. The recipient MMS Relay/Server is responsible not to show the originator address to the recipient MMS User Agent.

…

7.1.9 Address Hiding in MMS

An originator MMS User Agent may support a request for the sender's address to be hidden from the recipient(s). An MMSE may support such a request, i.e., it may allow address hiding. In any case, a recipient MMSE shall ensure that a sender's address is hidden from the recipient MMS User Agent when address hiding is requested for an MM.

If the originator's MMS Relay/Server does not allow address hiding (anonymous messages) (e.g. legislation does not permit anonymous messages) a message containing a request for address hiding shall be rejected upon submission and the originator's MMS Relay/Server shall return an error information to the originator MMS User Agent.

In the case of originator's MMS Relay/Server rejects the message because it does not allow address hiding the rejection information shall be delivered in a submit response together with optional status text.

In case the recipient MMS Relay/Server rejects the message because it does not allow address hiding and the originator MMS User Agent has requested a delivery report, then the recipient MMS Relay/Server shall inform the originator of the message rejection within the delivery report.

In case the recipient MMS Relay/Server rejects the message because it does not allow address hiding and the originator MMS User Agent has not requested a delivery report, then the originator MMS Relay/Server may inform the MM originator by generating a new MM which is sent back to the MM originator.

Independent of whether or not the originator's address is shown or hidden to the recipient, the originator may be able to ask for a delivery report to an MM and also receive the delivery report according to the normal behaviour of the MMS framework.

If the originator MMS User Agent has requested both its address to be hidden and a read-reply report the originator MMS User Agent might not receive the read-reply report.

If the recipient forwards the MM outside the MMSE and the peer entity is unknown to the forwarding MMS Relay/Server the recipient MMS Relay/Server shall not transfer the originator's address but replace it with either appropriate coded address or leave the originator address field blank.

If the originator MMS User Agent has requested its address to be hidden and MM is targeted to the VASP/VAS, MMS Relay/Server shall send originator address to the VASP/VAS but not the request of address hiding. If the originator has requested address hiding the originator MMS Relay/Server may replace the originator address with an appropriate coded address, leave the originator address empty, or send the originator address unaltered to the VASP. If the VASP/VAS targeted is not allowed to receive originator address information, e.g. due to privacy issues, the MMS Relay/Server may replace the originator address with an appropriate coded address or leave the originator address empty.

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7.2 MMSE Addressing responsibilities

Address parsing:

MMS Relay/Server should parse the recipient address field provided by the originator MMS User Agent upon MM submission. If an error is found in the address format, an error indication should be sent back to the MMS User Agent in the submit response.

Locating the recipient:

For each recipient that appears in an MM, the MMS Relay/Server shall be able to resolve whether the recipient belongs to the same MMSE, another MMSE or is not known to belong to any MMSE or the recipient is VASP. If the recipient belongs to the same MMSE, the MMS Relay/Server shall notify the recipient of the new MM as described in clause 7.1.2. If the recipient appears to belong to another MMSE, the MMS Relay/Server has to locate the external recipient's MMSE domain. If the recipient is not known to belong to any MMSE, the MMS Relay/Server shall perform the necessary conversion and route forward the message to the recipient. If the recipient is VASP, the MMS Relay/Server shall deliver MM to the VASP according to the recipient address in MM.

7.2.1 Address Formats on MM4

Resolving the recipient's MMSE IP address:

For those recipients that appear in an MM and belong to an external MMSE, the originator MMS Relay/Server has to send the message to the recipient's MMS Relay/Server using the protocol described in clause 7.7. The MMS Relay/Server has to resolve the recipient's MMS Relay/Server domain name to an IP address, e.g. using DNS, based on the recipient's address. The mapping for the recipient's address to the recipient's MMS Relay/Server if the MM recipient belongs to another MMSE is left for standardisation in future releases. It is expected that ENUM mechanism will be used for this resolution. In the mean time, MMS service providers or network operators may use solutions for their particular needs, which may include static tables or other look-up methods.

Re-formatting the sender's and recipient's address to FQDN format

When delivering a message from an MMSE to another MMSE, both the sender and the recipient addresses shall be extended to include the FQDN to enable transport over SMTP. This FQDN format shall be used in the MM4 reference point. It is required that FQDN format address is used in "MAIL FROM: " and "RCPT TO: " commands in SMTP, it is not necessary that the originator's and recipient's addresses in RFC 822 "From: " or "To"–fields are re-formatted to FQDN format.

The encoding of FQDN addressing is defined in Clause 8.4.5.1.

7.2.2 Address Formats on MM1

The MMS addressing model on MM1 contains three addresses: the address of the MMS Relay/Server, the address of the recipient and the address of the originator. The address of the MMS Relay/Server shall be the URI of the MMS Relay/Server given by the MMS service provider. Thus, the URI needs to be configurable in the MMS User Agent.

The originator's and the recipient's address could be either a user's address or a user's terminal address. For this release the user's terminal addresses (e.g. terminal IP addresses) are not supported. The MMS User Agent's responsibility is to format these addresses before it submits the message to the originator MMS Relay/Server.

The reference point MM1 should support E.164 (MSISDN) and/or RFC822 addressing, and it should support a way to indicate the used address type to enable future extension. The encoding of the addressing is up to the corresponding implementation.

E.g. the originator MMS User Agent may specify each of the address fields in one of the following formats:

1) RFC 822 address (FQDN) ["/TYPE= rfc822"]
2) +E.164 ["/TYPE= PLMN"] as [[CC] + NC] + SN
3) Other "/TYPE= "

The "/TYPE= " field specifies the address type. When E.164 or RFC822 formats are used the type is optional. The "/TYPE= " convention provides flexibility for future enhancements.

7.2.3 Address Formats on MM7

The MMS addressing model on MM7 contains two addresses: The address of the originator MMS User Agent or VAS/VASP and the address(es) of the recipient MMS User Agent(s) or VAS/VASP.

The reference point MM7 shall support E.164 (MSISDN) addresses and e-mail addresses (RFC2822). In addition Short Codes should be supported.

In the case of a multimedia message terminated at the VAS/VASP, the recipient(s)' address(es) may be the VAS/VASP address or the intended recipient(s)' address and the originator's address shall be user's address (e.g. MSISDN address) or a user's terminal address. For this release the user's terminal addresses (e.g. terminal IP addresses) are not supported.

In the case of a multimedia message originated from the VAS/VASP, the originator's address may be the VAS/VASP address and the recipient(s)' address(es) shall be either a user's address or a user's terminal address. For this release the user's terminal addresses (e.g. terminal IP addresses) are not supported. The VASP's responsibility is to format these addresses before it submits the message to the MMS Relay/Server. The user's address shall be E.164 (MSISDN) address or e-mail address (RFC2822).

The reference point MM7 defines also other addressing like information elements: VASP ID, VAS ID and MMS Relay/Server ID. These fields are used only to identify VASP, VAS and MMS Relay/Server and are not used for addressing purpose.

Note: The users' addresses refered to above may be replaced by appropriate coded addresses in order not to harm the users' privacy.

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Sophia Antipolis, France
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CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **061** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Reference point MM8 to billing system
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	14.02.2002
Category:	⌘	**B**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	In the 3GPP TS 32.200 is in Figure 3: "3G charging logical architecture" a connection between the MMS Relay/Server and the billing system.
Summary of change:	⌘	Introducing a new reference point MM8. It is the interface between MMS Relay/Server and the billing system.
Consequences if not approved:	⌘	Inconsistency to the specification TS 32.200

Clauses affected:	⌘	
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

6.1 MMS Reference Architecture

Figure 3 shows the MMS Reference Architecture and identifies reference points within an MMSNA that are further described below. Abstract messages are indicated in clause 8 that describe the logical message exchange on these reference points on a high-level basis.

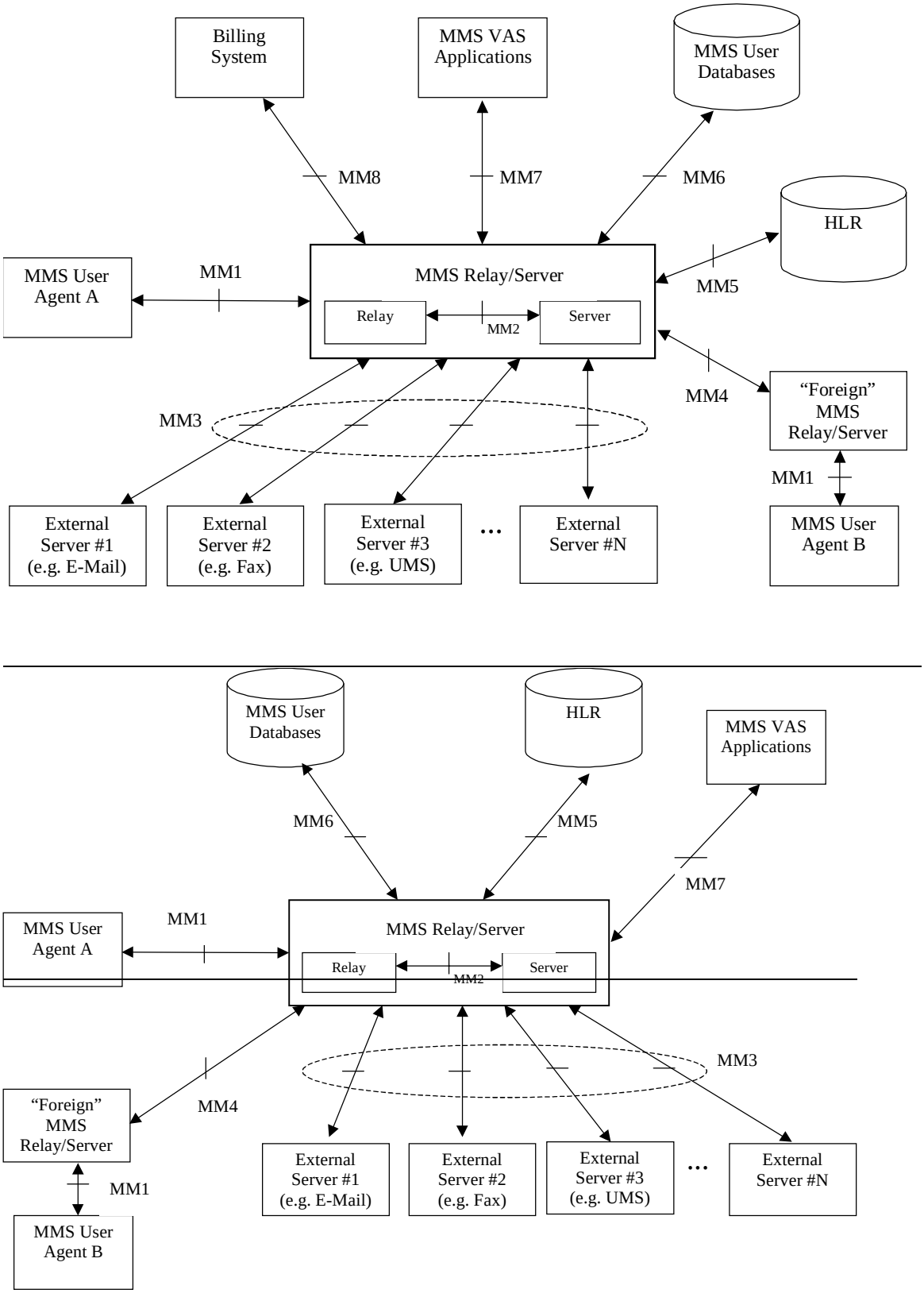

Figure 3: MMS Reference Architecture

The interfaces in the MMS Reference Architecture are:

MM1: The reference point between the MMS User Agent and the MMS Relay/Server.

MM2: The reference point between the MMS Relay and the MMS Server.

MM3: The reference point between the MMS Relay/Server and external (legacy) messaging systems.

MM4: The reference point between the MMS Relay/Server and another MMS Relay/Server that is within another MMSE.

MM5: The reference point between the MMS Relay/Server and the Home Location Register (HLR).

MM6: The reference point between the MMS Relay/Server and the MMS User Databases.

MM7: The reference point between the MMS Relay/Server and MMS VAS Applications.

MM8: The reference point between the MMS Relay/Server and a billing system

…

6.10 MM8: MMS Relay/Server – Billing system

This reference point is outside the scope of this release of the present document.

…

8.8 Technical realisation of MMS on reference point MM8

This reference point is outside the scope of this release of the present document.

3GPP TSG-T WG2 #16
Sophia Antipolis, France
11st – 15th January 2002

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CHANGE REQUEST

⌘ **23.140** **CR** **060** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☒ Radio Access Network ☐ Core Network ☒

Title:	⌘	MM1 addressing formats
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	February 14th, 2002
Category:	⌘	**C**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	Currently the MM1 interface supports E.164 (MSISDN) and/or RFC 822 addressing. This means that operators have the option to implement MMS supporting only one of the two addressing schemes. This leads to interoperability problems between operators with different MM1 addressing schemes. Furthermore MMS UAs, which would only support the E.164 (MSISDN) addressing scheme, would not be able to send MMs to the Internet. These problems could partly be solved in the network, at the expense of considerable costs. So, in order to solve these problems, both addressing schemes should be supported by the MMS UA and the MMS Relay/Server. Also, allow a VASP to be addressed via "short codes" to facilitate identification of MM1 submissions that are intended for MM7.
Summary of change:	⌘	Made both MSISDN and RFC 822 address types mandatory. And added the definition of an "unqualified RFC822 address". Added a format to allow sending MMs to local phone numbers or numeric short codes. Added rules to disambiguating untyped addresses.
Consequences if not approved:	⌘	Interoperability problems between operators may occur. How an MMS Relay/Server differentiates a MM1 message intended for delivery to a VASP would not be clarified.

Clauses affected:	⌘	7.2.2
Other specs	⌘	☐ Other core specifications ⌘

affected:	☐ Test specifications ☐ O&M Specifications	
Other comments: ⌘		

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

7.2.2 Address Formats on MM1

The MMS addressing model on MM1 contains three addresses: the address of the MMS Relay/Server, the address of the recipient and the address of the originator. The address of the MMS Relay/Server shall be the URI of the MMS Relay/Server given by the MMS service provider. Thus, the URI needs to be configurable in the MMS User Agent.

The originator's~~and the recipient's~~ address could be either a user's address or a user's terminal address. The recipient's address can be a user's address, a user's terminal address, or a short code. For this release the user's terminal addresses (e.g. terminal IP addresses) are not supported. The MMS User Agent's responsibility is to format these addresses before it submits the message to the originator MMS Relay/Server.

The user's address can be either an E.164 (MSISDN) or RFC822 address.

The MMS User Agent and MMS Relay/Server shall support both E.164 (MSISDN) and RFC822 addressing formats. The reference point MM1~~should support E.164 (MSISDN) and/or RFC822 addressing, and it~~ should support a way to indicate the used address type to enable future extension. The encoding of the addressing is up to the corresponding implementation.

E.g. the originator MMS User Agent may specify each of the address fields in one of the following formats:

1) RFC 822 address (FQDN or unqualified) ["/TYPE= rfc822"]
2) ~~+E.164 ["/TYPE= PLMN"] as [[CC] + NC] + SN~~PLMN address: ["+" | "*" | "#"] [*digit* | "*" | "#"] … ["/TYPE= PLMN"]
3) Other "/TYPE= "

The "/TYPE= " field specifies the address type. When ~~E.164~~PLMN or RFC822 formats are used the type is optional. The "/TYPE= " convention provides flexibility for future enhancements.

When the "/TYPE=" qualifier is absent, the MMS Relay/Server should resolve potential ambiguities by applying the following logic to the address in the following order:

1. if it contains the "@" character, the address should be interpreted as an FQDN RFC822 address
2. if it is completely numeric, except possibly including "+", "*", or "#", it should be interpreted as "/TYPE= PLMN", e.g. an E.164 address, a local telephone number, or a numeric short code,
3. otherwise, it should be interpreted as an unqualified RFC822 address (alphanumeric short code)

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CHANGE REQUEST

⌘ **23.140** **CR** **059** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Correction to Call Data Records definitions
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	05.02.2002
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	Currently TS 23.140 Annex C is not inline with other sections of specification. Also Annex C gives some misleading information what are the capabilities of MMS Relay/Server to generate CDRs.
Summary of change:	⌘	Deleted some parameters irrelevant for Release 5, added note to explain behaviour of different parameters. The title of Annex C is changed to be inline with SA5 specifications (e.g. 32.200)
Consequences if not approved:	⌘	Annex C is not inline with other sections of 23.140 Release 5. Also some misleading information is left to standards.

Clauses affected:	⌘	Annex C
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Annex C (informative): Call Data Records

This annex describes information of MMs/abstract messages which may be required for inclusion into Call Data Records (CDR's) for MMS for the purpose of Billing and Traceability.

This list of information elements ~~is not complete but~~ may include~~s~~:

- ~~MMS specific message~~Message ~~–~~ ID of Multimedia Message
- Recipient address(es)
- Sender address
- Message size ~~(sent/received)~~

~~Identification if a message has been sent to a pre-defined group~~

- Time stamp ~~(including timezone)~~: for submission time, earliest delivery time and time of expiry
- Duration of transmission ~~(e.g.~~ for streaming purposes)
- Duration of storage (in the MMS Relay/S~~s~~erver)
- Type of message: (e.g. notification, message MM, delivery report, read-reply)
- Bearer type used
- Content information ~~—~~(e.g. audio, picture, video, text,)
- Message class (e.g. advertisement/informational)
- Delivery Report Request
- Read Reply Request
- Charging Indicator ~~(~~e.g. Pre paid charging, Reply charging~~, Reverse charging, Third party financed~~)
- MM7 service code
- MM Status (e.g. delivered, ~~abandoned~~rejected, ~~time~~ expired, delivery pending).
- Indication of forwarding

~~This information shall be time-stamped.~~

~~The following information elements at least will be considered for the future.~~

~~A specific class/type for MMS used for the Instant Messaging functionality~~

- Conversion of type and media

~~Security level used~~

- Priority of the MM~~/QoS~~

The following information elements at least will be considered for the future.

- Other Charging Indicator (e.g. Reverse Charging)
- Identification if a message has been sent to a pre-defined group

Note: Some of the above fields may not be available in the MMS Relay/Server e.g. due to network implementation options. Also some fields may not be directly available from MMS Relay/Server CDRs but defined in the Charging and Billing system.

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11-15 February 2002

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CHANGE REQUEST

⌘ **23.140** **CR** **058** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Editorial changes
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	15.01.2002
Category:	⌘	**D**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	The 23.140 does not use the same abbreviation as in used in 21.905. For a better reading of the specification, some sections are switched. Also, wrong cross-refrences fixed
Summary of change:	⌘	Changing the Call Data Record to Charging Data Record. Changing the sections 6.6 –6.8 Add a description to the figure in Annex E Correction of the references to other clauses
Consequences if not approved:	⌘	The 23.140 is not in line with the 21.905 and the chapter numbers are in the wrong sequence. Also a description to a figure is missing and some references are not correct.

Clauses affected:	⌘	3.2; 4.2; 5.2; 6.6 – 6.8; 7.2; Annex A; Annex B Annex C; Annex E
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications
	⌘	
Other comments:	⌘	To MCC: Please note that some sections are shuffled around by this CR which might also be affected by other CRs. Hence, the incorporation of this CR needs to be done very carefully.

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3.2 Abbreviations

For the purposes of the present document, the abbreviations defined in [1] and [2] and the following apply:

CDR	~~Call~~Charging Data Record
DNS	Domain Name System
EMA	Electronic Message Association
E-Mail	Electronic Mail
ENUM	Electronic Numbering
FQDN	Fully Qualified Domain Name
GW	Gateway
HTTP	Hypertext Transfer Protocol
IANA	Internet Assigned Numbering Authority
IETF	Internet Engineering Task Force
IMAP4	Internet Message Access Protocol
MIME	Multipurpose Internet Mail Extensions
MM	Multimedia Message
MMS	Multimedia Messaging Service
MMSE	Multimedia Messaging Service Environment
MMSNA	Multimedia Messaging Service Network Architecture
MTA	Mail Transfer Agent
PDU	Protocol Data Unit
POP3	Post Office Protocol Version 3
RADIUS	Remote Authentication Dial In User Service
RDF	Resource Description Format
RFC	Request for Comments
SMIL	Synchronised Multimedia Integration Language
SMTP	Simple Mail Transfer Protocol
UA	User Agent
UAProf	User Agent Profile
URI	Uniform Resource Identifiers
VAS	Value Added Service
VPIM	Voice Profile for Internet Mail
W3C	WWW Consortium
WAP	Wireless Application Protocol
WIM	WAP Identity Module
WML	Wireless Markup Language
WSP	WAP Session Protocol
WTLS	Wireless Transport Layer Security

…

4.2 Involved MMS Elements

Figure 2 shows that multimedia messaging may encompass many different network types. The basis of connectivity between these different networks shall be provided by the Internet protocol and its associated set of messaging protocols. This approach enables messaging in 2G and 3G wireless networks to be compatible with messaging systems found on the Internet.

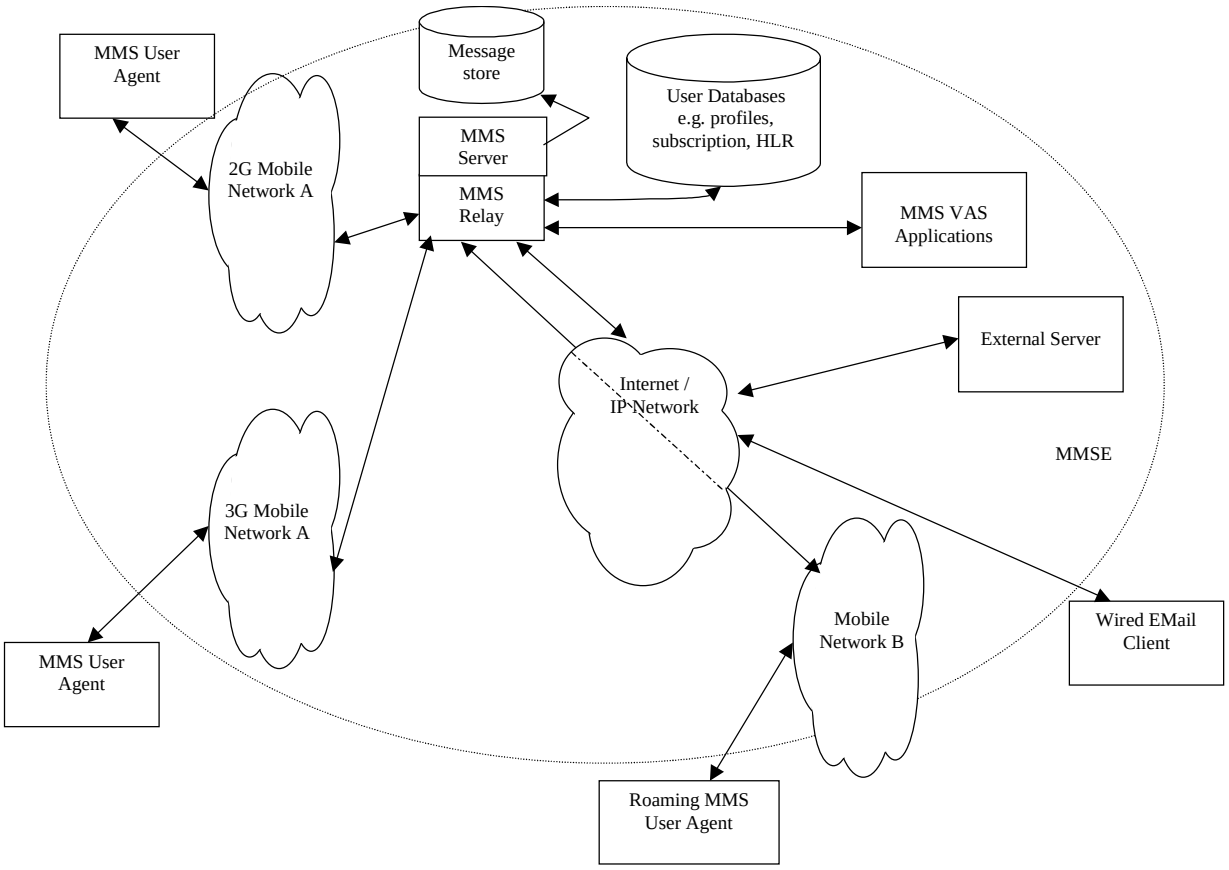

Figure 2: MMS Architectural Elements

MMSNA

The Multimedia Messaging Service Network Architecture encompasses all the various elements that provide a complete MMS to a user (including interworking between service providers).

MMSE

The MMSE is a collection of MMS-specific network elements under the control of a single administration. In the case of roaming the visited network is considered a part of that user's MMSE. However, subscribers to another service provider are considered to be a part of a separate MMSE.

MMS Relay/Server

The MMS Relay/Server is responsible for storage and handling of incoming and outgoing messages and for the transfer of messages between different messaging systems. Depending on the business model, the MMS Relay/Server may be a single logical element or may be separated into MMS Relay and MMS Server elements. These may be distributed across different domains.

The MMS Relay/Server should be able to generate charging data (~~Call~~Charging Data Record - CDR) when receiving MMs from or when delivering MMs to another element of the MMSNA.

MMS User Databases

This element may be comprised of one or more entities that contain user related information such as subscription and configuration (e.g. user profile, HLR).

MMS User Agent

The MMS User Agent resides on a UE, an MS or on an external device connected to a UE/MS. It is an application layer function that provides the users with the ability to view, compose and handle MMs (e.g. submitting, receiving, deleting of MMs).

MMS VAS Applications

The MMS VAS Applications offer Value Added Services to MMS users. There could be several MMS VAS Applications included in or connected to an MMSE. MMS VAS Applications may be able to generate CDRs.

…

5.2 MMS Relay/Server

The MMS Relay/Server is responsible for storage and notification, reports, and general handling of messages. The MMS Relay/Server may also provide convergence functionality between External Servers and MMS User Agents and thus enable the integration of different server types across different networks. An Example can be found in Annex A.

It is possible to separate the MMS Relay/Server element into MMS Relay and MMS Server elements, but an allocation of the MMS Relay/Server functionalities to such elements is not defined in this release.

The MMS Relay/Server is responsible for the following functions:-

- receiving and sending MM;
- enabling/disabling MMS function;
- personalising MMS based on user profile information;
- MM deletion based on user profile or filtering information;
- media type conversion;
- media format conversion;
- conversion of messages arriving at the recipient MMS Relay/Server from legacy messaging systems to MM format (e.g. facsimile to MM)
- conversion of MMs leaving the originator MMS Relay/Server to legacy messaging systems to the appropriate message format (e.g. MM to internet email)
- message content retrieval;
- MM forwarding;
- screening of MM;
- negotiation of terminal capabilities;
- checking terminal availability;
- MM notification to the MMS User Agent;
- generating delivery reports;
- routing forward MMs and read-reply reports;
- generating ~~call~~charging data records (CDR);
- address translation.

- address hiding
- managing the message properties on servers (e.g. voicemail or email server) integrated in the MMSE (consistency)
- temporary and/or persistent storage of messages
- ensuring that messages are not lost until successfully delivered to another MMSE element
- controlling the reply-charging feature of MMS

…

6.5 MM3: MMS Relay/Server – External Servers

Reference point MM3 is used by the MMS Relay/Server to send Multimedia Messages to and retrieve MMs from servers of external (legacy) messaging systems that are connected to the service provider's MMS Relay/Server.

This reference point is further elaborated in clause 8.3. In addition, several examples of realisations of reference point MM3 between the MMS Relay/Servers and External Servers can be found in Annex A.

~~6.6 MM6: MMS Relay/Server – MMS User Databases~~

~~This reference point is outside the scope of this release of the present document.~~

~~6.7 MM5: MMS Relay/Server – HLR~~

~~Reference point MM5 may be used to provide information to the MMS Relay/Server about the subscriber. If this reference point is provisioned then it shall use existing MAP operations (e.g. procedures for determining the location of the mobile, procedures for alerting SMS service centres). Future releases may elaborate this area further.~~

~~In case of using SMS as the bearer for notification this reference point is not necessary.~~

6.~~8~~6 MM4: Interworking of different MMSEs

Reference point MM4 between MMS Relay/Servers belonging to different MMSEs is used to transfer messages between them. Interworking between MMS Relay/Servers shall be based on SMTP according to STD 10 (RFC 821) [22] as depicted in figure 5.

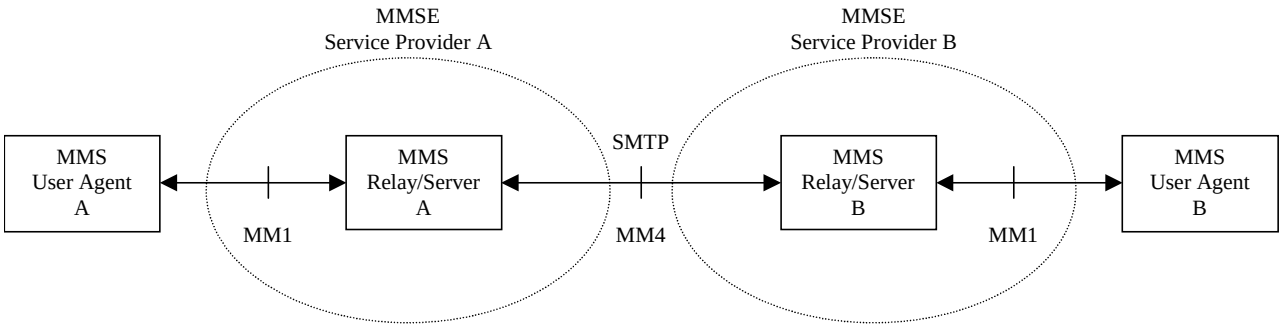

Figure 5: Interworking of different MMSEs

Interworking between different MMS service providers is further elaborated in clause 8.4.

6.7 MM5: MMS Relay/Server – HLR

Reference point MM5 may be used to provide information to the MMS Relay/Server about the subscriber. If this reference point is provisioned then it shall use existing MAP operations (e.g. procedures for determining the location of the mobile, procedures for alerting SMS service centres). Future releases may elaborate this area further.

In case of using SMS as the bearer for notification this reference point is not necessary.

6.8 MM6: MMS Relay/Server – MMS User Databases

This reference point is outside the scope of this release of the present document.

6.9 MM7: MMS Relay/Server – MMS VAS Applications

Reference point MM7 is used to transfer MMs from MMS Relay/Server to MMS VAS applications and to transfer MMs from MMS VAS applications to MMS Relay/Server. This reference point shall be based on existing protocols e.g. SMTP or HTTP for this release of the specification. Future releases may propose a mandatory protocol and encoding schemes. The service provider may decide to use an encoding format in this reference point, which uses the encoding implementation used in the MM1 reference point.

…

7.2 MMSE Addressing responsibilities

Address parsing:

MMS Relay/Server should parse the recipient address field provided by the originator MMS User Agent upon MM submission. If an error is found in the address format, an error indication should be sent back to the MMS User Agent in the submit response.

Locating the recipient:

For each recipient that appears in an MM, the MMS Relay/Server shall be able to resolve whether the recipient belongs to the same MMSE, another MMSE or is not known to belong to any MMSE. If the recipient belongs to the same MMSE, the MMS Relay/Server shall notify the recipient of the new MM as described in clause 7.1.2. If the recipient appears to belong to another MMSE, the MMS Relay/Server has to locate the external recipient's MMSE domain. If the recipient is not known to belong to any MMSE, the MMS Relay/Server shall perform the necessary conversion and route forward the message to the recipient.

7.2.1 Address Formats on MM1

The MMS addressing model on MM1 contains three addresses: the address of the MMS Relay/Server, the address of the recipient and the address of the originator. The address of the MMS Relay/Server shall be the URI of the MMS Relay/Server given by the MMS service provider. Thus, the URI needs to be configurable in the MMS User Agent.

The originator's and the recipient's address could be either a user's address or a user's terminal address. For this release the user's terminal addresses (e.g. terminal IP addresses) are not supported. The MMS User Agent's responsibility is to format these addresses before it submits the message to the originator MMS Relay/Server.

The reference point MM1 should support E.164 (MSISDN) and/or RFC822 addressing, and it should support a way to indicate the used address type to enable future extension. The encoding of the addressing is up to the corresponding implementation.

E.g. the originator MMS User Agent may specify each of the address fields in one of the following formats:

1) RFC 822 address (FQDN) ["/TYPE= rfc822"]

2) +E.164 ["/TYPE= PLMN"] as [[CC] + NC] + SN

3) Other "/TYPE= "

The "/TYPE= " field specifies the address type. When E.164 or RFC822 formats are used the type is optional. The "/TYPE= " convention provides flexibility for future enhancements.

7.2.21 Address Formats on MM4

Resolving the recipient's MMSE IP address:

For those recipients that appear in an MM and belong to an external MMSE, the originator MMS Relay/Server has to send the message to the recipient's MMS Relay/Server using the protocol described in clause 7.7.6.6 The MMS Relay/Server has to resolve the recipient's MMS Relay/Server domain name to an IP address, e.g. using DNS, based on the recipient's address. The mapping for the recipient's address to the recipient's MMS Relay/Server if the MM recipient belongs to another MMSE is left for standardisation in future releases. It is expected that ENUM mechanism will be used for this resolution. In the mean time, MMS service providers or network operators may use solutions for their particular needs, which may include static tables or other look-up methods.

Re-formatting the sender's and recipient's address to FQDN format

When delivering a message from an MMSE to another MMSE, both the sender and the recipient addresses shall be extended to include the FQDN to enable transport over SMTP. This FQDN format shall be used in the MM4 reference point. It is required that FQDN format address is used in "MAIL FROM: " and "RCPT TO: " commands in SMTP, it is not necessary that the originator's and recipient's addresses in RFC 822 "From: " or "To"–fields are re-formatted to FQDN format.

The encoding of FQDN addressing is defined in Clause 8.4.5.1.

7.2.2 Address Formats on MM1

The MMS addressing model on MM1 contains three addresses: the address of the MMS Relay/Server, the address of the recipient and the address of the originator. The address of the MMS Relay/Server shall be the URI of the MMS Relay/Server given by the MMS service provider. Thus, the URI needs to be configurable in the MMS User Agent.

The originator's and the recipient's address could be either a user's address or a user's terminal address. For this release the user's terminal addresses (e.g. terminal IP addresses) are not supported. The MMS User Agent's responsibility is to format these addresses before it submits the message to the originator MMS Relay/Server.

The reference point MM1 should support E.164 (MSISDN) and/or RFC822 addressing, and it should support a way to indicate the used address type to enable future extension. The encoding of the addressing is up to the corresponding implementation.

E.g. the originator MMS User Agent may specify each of the address fields in one of the following formats:

1)RFC 822 address (FQDN) ["/TYPE= rfc822"]

2)+E.164 ["/TYPE= PLMN"] as [[CC] + NC] + SN

3)Other "/TYPE= "

The "/TYPE= " field specifies the address type. When E.164 or RFC822 formats are used the type is optional. The "/TYPE= " convention provides flexibility for future enhancements.

…

Annex A (informative): Examples of MMS architectural implementations

A.1 Introduction

This informative annex is intended to provide architectural examples based on the general architecture as outlined in clause 4 to show implementations for different business models. The focus is upon the various MMS Relay - MMS Server and MMS Relay/Server – External Server scenarios, whereas the MMS Relay/Server - MMS User Agent interface is assumed to be as stated in clause ~~7.2.~~6.3 Each of the following subclauses provides only one possible scenario, however a combination could be feasible. Please note that each functional element should be understood as a logical entity and may be combined due to implementation reasons.

A.2 Example of combined MMS-Relay/Server

This scenario shows the case where the two logical entities, MMS Relay and MMS Server, are combined into a single physical entity.

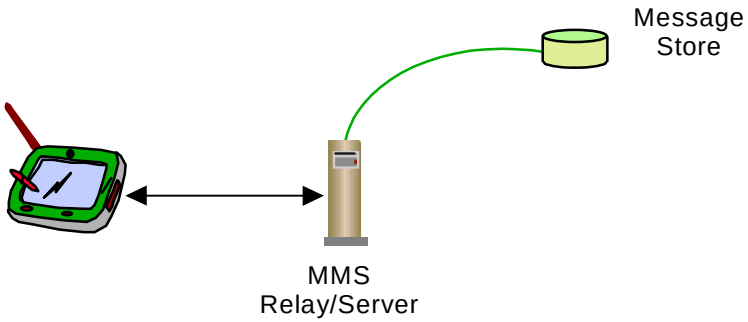

Figure A.1: Example of combined MMS-Relay/Server

A.3 Example of non-combined MMS-Relay and MMS-Server

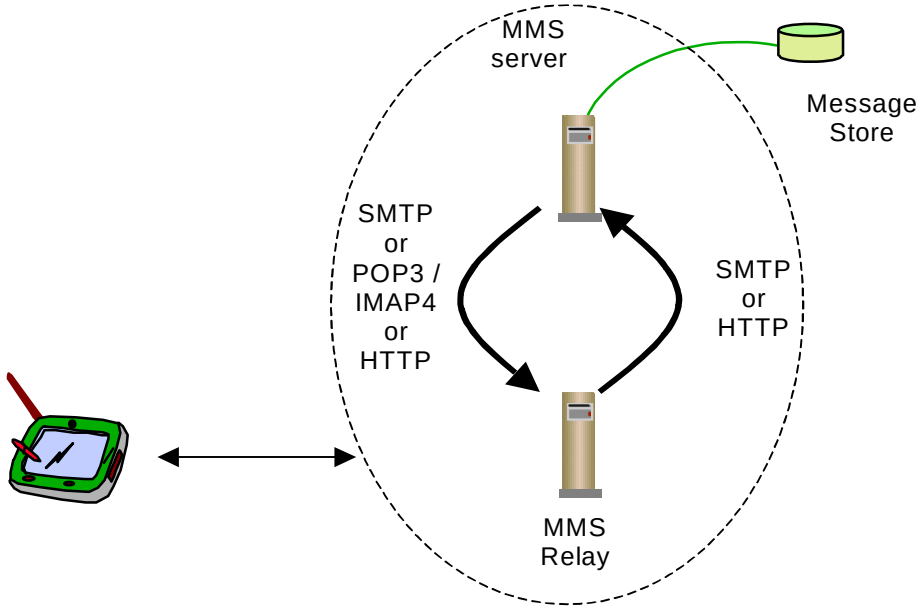

Figure A.2: Example of non-combined MMS-Relay and MMS-Server

For the transfer of messages between an MMS-Relay and an MMS-Server the use of SMTP and POP3[34]/IMAP4[35] or HTTP as illustrated in Figure A.2 is identified as appropriate.

If the protocol is SMTP for up- and download of messages to the server, then it may be identical to the one used between different MMS Relay/Servers as specified in the clause ~~7.7~~6.6.

A.4 Example of MMS interaction with T.30 Facsimile Services

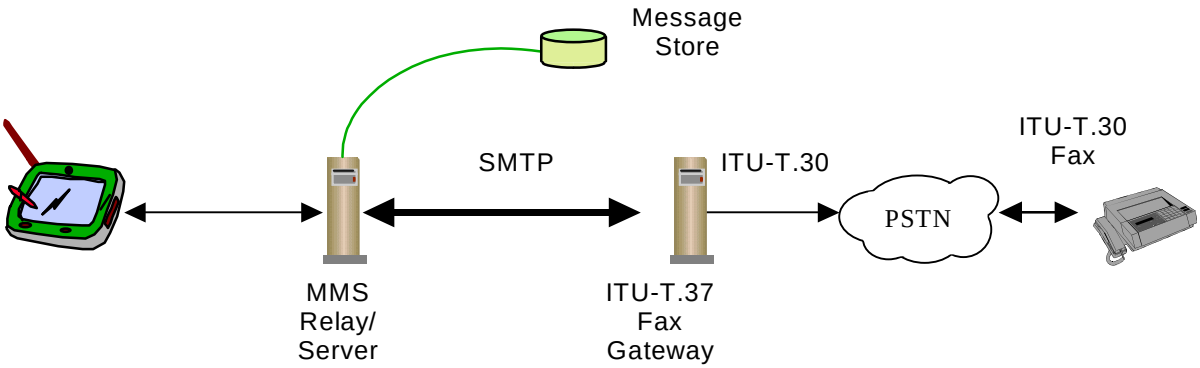

Figure A.3: Example of MMS interaction with Facsimile Services based on ITU-T.37

For the transfer of facsimile data via store-and-forward mechanisms ITU-T.37 [31] procedures have been standardised. These are identified as appropriate in the MMSE for the interworking with T.30 [32] facsimile services. What the relevant MMSE parts are supposed to look like for a T.37 approach is depicted in figure A.3. The MMS Relay/Server interfaces with a T.37 Fax Gateway. For the Gateway's communication with the MMS Relay/Server the appropriate protocol is SMTP. I.e., the protocol to be used on the interface between MMS-Relay/Server and the Fax GW is identical to the one used between different MMS Relay/Servers as specified in clause ~~7.7~~6.6.

Towards the PSTN the Fax-GW terminates the T.30 facsimile protocol. Mobile terminated fax data will be converted into TIFF[36] image format and forwarded to the MMS Relay/Server as an attachment in an IETF internet email. In case of mobile originated fax messages the Fax-GW receives a written email provided with the receiver's fax number from the MMS Relay/Server. Depending on the functions of the Fax-GW this email may contain plain text only or additional attachments, too. Although T.37 requires only TIFF format support there are Fax-GWs out on the market that permit many different formats to be included.

A.5 Example of MMS interaction with 2G/3G Voice Mailboxes

MMS interaction with voice mailbox systems should be performed on a non-realtime basis. Figure A.4 illustrates an example architecture for the incorporation of voice mailboxes.

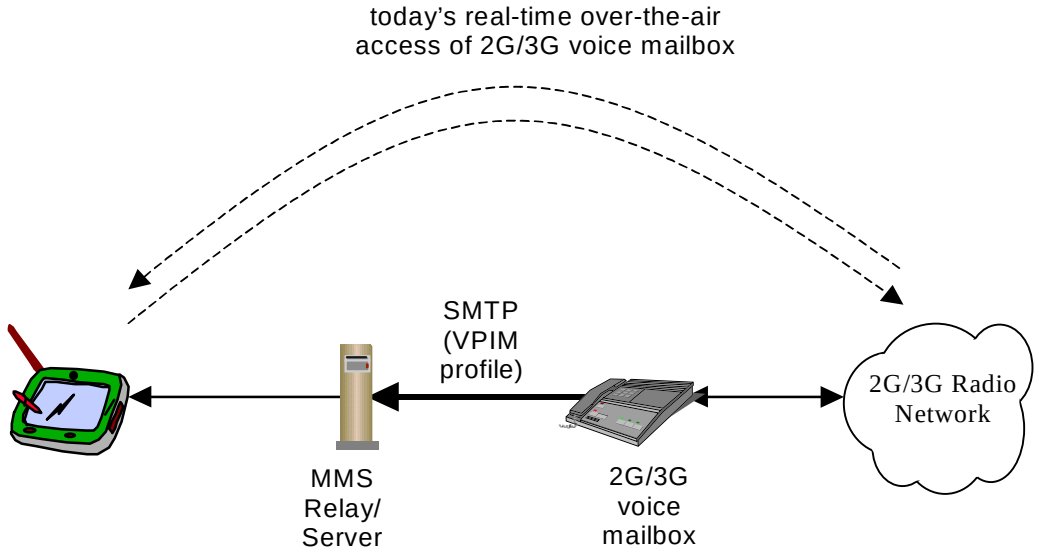

Figure A.4: First Example of MMS interaction with 2G/3G Voice Mailbox based on VPIM

The Voice Profile for Internet Mail Version 2, VPIMv2, provides format extensions for MIME supporting the transmission of voice messages over standard Internet E-Mail systems. The VPIM concept was developed by the Electronic Messaging Association (EMA). After VPIMv2 had been reviewed by the IETF it became RFC 2421 [33].

The VPIM specification allows voice records to be MIME encapsulated and sent as Internet mail attachments via SMTP or retrieved as Internet mail attachments via POP3 [34] or IMAP4[35]. The MIME type used for voice messages is "audio/*".

For the interaction of MMS with voice mailboxes, the voice mailbox may forward received voice records as VPIM messages via SMTP to the MMS Relay/Server. This implies that voice messages' download is always done via the MMS service. In this case the protocol to be used on the interface between MMS-Relay/Server and the voice mailbox is SMTP and thus identical to the one used between different MMS Relay/Servers as specified in clause ~~7.7~~6.6.

Alternatively, the MMS Relay/Server may poll the voice mailbox via POP3 or IMAP4 for new messages received. Messages the user wants to retrieve via the MMS service can then be downloaded via POP3/IMAP4 from the voice mailbox to the MMS Relay/Server from where they are delivered to the MMS User Agent. This enables the user to do both, retrieve voice messages via today's realtime voice mail services or as an MM. In any case it is expected that the voice mailbox is still the owner of the message and as a consequence responsible for the storage.

As an alternative the MMS interworking with a 2G/3G Voice Mailbox System could be envisaged via an HTTP interface as depicted in figure A.5.

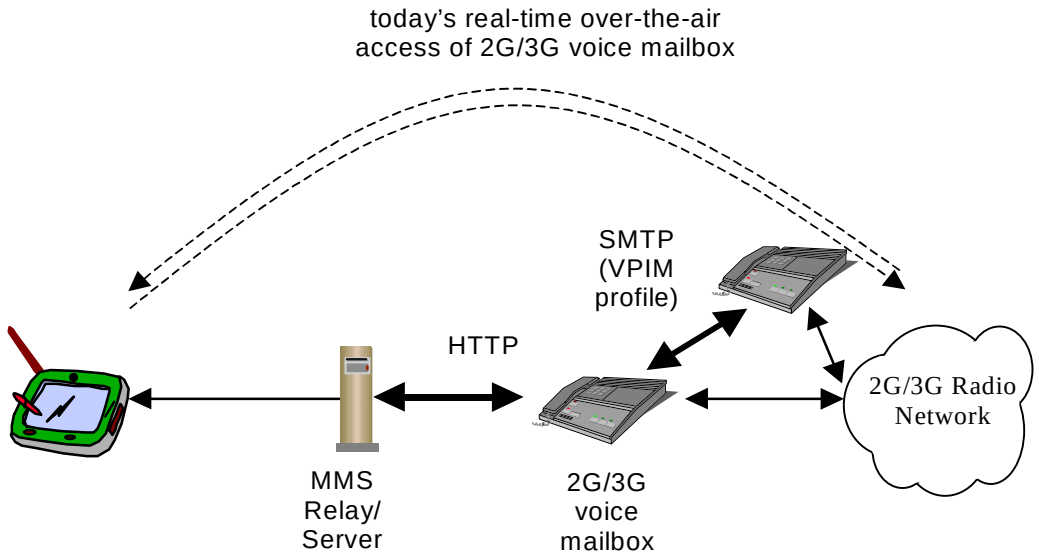

Figure A.5: Second example of MMS interaction with 2G/3G Voice Mailbox based on HTTP

A.6 Example of interaction with Internet E-Mail Messaging

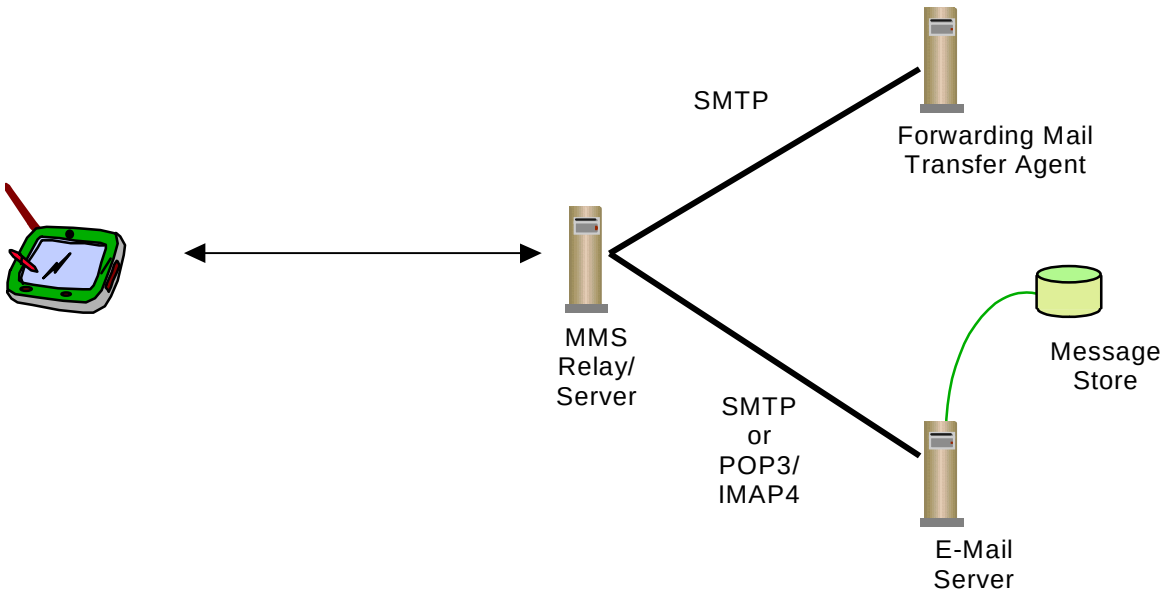

Figure A.6 Example of interaction with Internet E-Mail messaging

In this architecture the server will be an E-Mail server providing post office services which are accessible e.g. via POP3 [34] or IMAP[35] for Internet E-Mail retrieval in the MMSE or are accessible to the MMS Relay/Server using SMTP. The MMS Relay/Server will send messages that are to be transmitted as Internet E-Mail via SMTP.

In the case of retrieval and sending of MMs from and to the Internet Email service is done via SMTP, the protocol to be used on the interface between MMS Relay/Server and the Mail Transfer Agent, MTA/Email Server is identical to the one used between different MMS-Relays as specified in clause ~~7.7~~6.6.

…

B.1.1 Protocol Framework

In reference to clause ~~4.3~~6.2, the protocol framework applied to WAP implementation of MMS on reference point MM1 is provided in figure B.1.

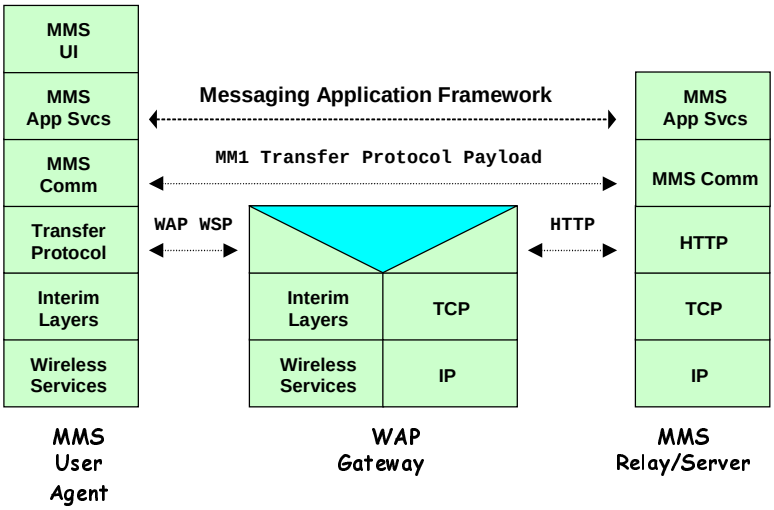

Figure B.1: Protocol Framework applied to WAP implementation of MMS

…

Annex C (informative): ~~Call~~Charging Data Records

This annex describes information of MMs/abstract messages which may be required for inclusion into ~~Call~~Charging Data Records (CDR's) for MMS for the purpose of Billing and Traceability.

This list of information elements is not complete but includes:

- MMS-specific message-ID
- Recipient address(es)
- Sender address
- Message size (sent/received)
- Identification if a message has been sent to a pre-defined group
- Time stamp (including timezone): for submission time, earliest delivery time and time of expiry
- Duration of transmission (e.g. for streaming purposes)
- Duration of storage (in the MMS server)

- Type of message: (e.g. notification, message MM, delivery report, read-reply)
- Bearer type used
- Content information(e.g. audio, picture, video, text,)
- Message class (e.g. advertisement/informational)
- Delivery Report Request
- Read Reply Request
- Charging Indicator (e.g. Pre paid charging, Reply charging, Reverse charging, Third party financed)
- MM Status (e.g. delivered, abandoned, time expired, delivery pending).
- Indication of forwarding

This information shall be time-stamped.

The following information elements at least will be considered for the future.

- A specific class/type for MMS used for the Instant Messaging functionality
- Conversion of type and media
- Security level used
- Priority/QoS

…

Annex E (informative): Use cases for Reply-Charging

The following detailed example use case of reply-charging describes the case when MMS User Agent A and MMS User Agent B belong to the same MMSE. MMS User Agent A is the sender of the reply-charged MM and MMS User Agent B is the recipient of the reply-charged MM.

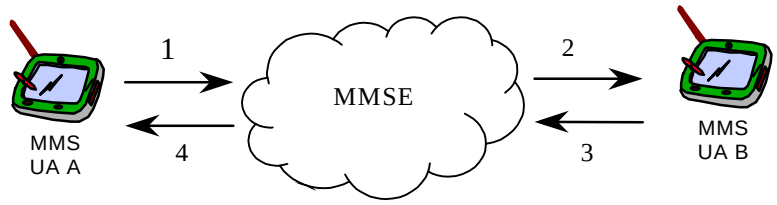

Figure E.1: Message flow in case of reply-charging

1. User A produces an MM and marks it "reply-charged" before it is submitted to the MMS Relay/Server. The MMS Relay/Server notes that user A is willing to pay for a reply-MM to this particular MM and notes the message-ID of the original MM and the originator's limitations.

2. The MM is retrieved by user B in accordance to the user profile of user B. This might imply charges for user B when retrieving the MM. User B retrieves the original MM and discovers that the first reply to this message (that is accepted by the Service Provider) will be paid by user A.

3. User B creates an answer, the MMS User Agent B marks it as a reply-MM and submits it on to the MMS Relay/Server. The MMS Relay/Server identifies this MM as a reply to the original MM and checks the originator's limitations. If the MMS Relay/Server accepts the reply the reference set before (as described in transaction 1) is deleted. User A is billed for transaction 3.

4. User A retrieves the reply-MM and eventually is billed for transaction 4.

The other use case of reply-charging where MMS User Agent A and MMS User Agent B belong to different MMS Service Providers is for future elaboration.

The use case of reply-charging where the originator MMS User Agent is actually the MMS VAS Application (using MM7 reference point) behaves in the same way as the use case of two MMS User Agents in the same MMSE.

3GPP TSG-T2 #16 **T2-020270**
Sophia Antipolis, France
11-15 February 2002

CR-Form-v4

CHANGE REQUEST

⌘ **23.140** **CR** **057** ⌘ ev **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☒ Radio Access Network ☐ Core Network ☒

Title:	⌘	MM1 <-> MM4 header mapping
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	020124
Category:	⌘	**B**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	For a complete MMS end-to-end solution the information elements used over MM1 needs to be normatively mapped onto the STD 11 headers used over MM4.
Summary of change:	⌘	Addition of annex X, containing mapping tables.
Consequences if not approved:	⌘	No stringent coupling between MM1 and MM4.

Clauses affected:	⌘	new annex X
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Annex X (Normative): MM1 <-> MM4 header mapping

This annex maps the information elements found on MM1 onto the STD 11 header fields of MM4.

The tables below are provided to give a normative end-to-end description of MMS. There is a table for each MM1 abstract message with all its information elements in the left column, the right column shows how the MM1 information elements are mapped onto the STD 11 headers of MM4.

In many cases there is no mapping between MM1 information elements and MM4 STD 11 header fields, this is according to specifications. These information elements are included in the tables below in order to give a complete picture of how the MM1 information elements are handled.

Table XX: Mapping MM1_submit.REQ -> MM4_forward.REQ

Information elements in MM1_submit.REQ	STD11 Header fields in Egress MM4_forward.REQ
Recipient address	To:, Cc:
Content type	Content-Type:
Sender address	From:
Message class	X-Mms-Message-Class:
Date and time	Date:
Time of Expiry	X-Mms-Expiry:
Earliest Delivery Time	-
Delivery report	X-Mms-Delivery-Report:
Reply-Charging	-
Reply-Deadline	-
Reply-Charging-Size	-
Priority	X-Mms-Priority:
Sender visibility	X-Mms-Sender-Visibility:
Read reply	X-Mms-Read-Reply:
Subject	Subject:
Reply-Charging-ID	-
Content	*<message body>*

Table XX: Mapping MM1_submit.RES -> MM4_forward.REQ

Information elements in MM1_submit.RES	STD11 Header fields in Egress MM4_forward.REQ
Request Status	-
Request Status Text	-
Message ID	X-Mms-Message-ID:

Table XX: Mapping MM1_notification.REQ <- MM4_forward.REQ

Information elements in MM1_notification.REQ	STD11 Header fields in Ingress MM4_forward.REQ
Message class	X-Mms-Message-Class:
Message size	-
Time of expiry	X-Mms-Expiry:
Message Reference	-
Subject	Subject:
Priority	X-Mms-Priority:
Sender address	From:
Delivery report	X-Mms-Delivery-Report:
Reply-Charging	-
Reply-Deadline	-
Reply-Charging-Size	-
Reply-Charging-ID	-
Element-Descriptor	-

Table XX: Information elements in the MM1_notification.RES.

Information elements in MM1_notification.RES	MM4 STD 11 Header fields
MM Status	-
Report allowed	-

Table XX: Information elements in the MM1_retrieve.REQ

Information elements in MM1_retrieve.REQ	MM4 STD 11 Header fields
Message Reference	-

Table XX: Mapping MM1_retrieve.RES <- MM4_forward.REQ

Information elements in MM1_retrieve.RES	STD11 Header fields in Ingress MM4_Forward.REQ
Message ID	X-Mms-Message-ID:
Sender address	From:
Content type	Content-type:
Recipient address	To:
Message class	X-Mms-Message-Class:
Date and time	Date:
Delivery report	X-Mms-Delivery-Report:
Priority	X-Mms-Priority:
Read reply	X-Mms-Read-Reply:
Subject	Subject:
Status	-
Status Text	-
Reply-Charging	-
Reply-Charging-ID	-
Reply-Deadline	-
Reply-Charging-Size	-
Previously-Sent-By	X-Mms-Previously-Sent-By
Previously-Sent-Date	X-Mms-Previously-Sent-Date
Content	*<message body>*

Table XX: Information elements in the MM1_acknowledgement.REQ

Information elements in MM1_acknowledgement.REQ	MM4 STD 11 Header fields
Report allowed	-

Table XX: Mapping MM1_forward.REQ -> MM4_forward.REQ

Information elements in MM1_forward.REQ	STD11 Header fields in Egress MM4_Forward.REQ
Recipient address	To:, Cc:
Forwarding address	From:
Date and time	Date:
Time of Expiry	X-Mms-Expiry:
Earliest delivery time	-
Delivery report	X-Mms-Delivery-Report:
Read reply	X-Mms-Read-Reply:
Message Reference	-

Table XX: Information elements in the MM1_forward.RES.

Information elements in MM1_forward.RES	MM4 STD 11 Header fields
Status	-
Status Text	-
Message ID	-

Table XX: Mapping MM1_delivery_report.REQ <- MM4_delivery_report.REQ

Information elements in MM1_delivery_report.REQ	STD11 Header fields in Ingress MM4_delivery_report.REQ
Message ID	X-Mms-Message-ID
Recipient address	From:
Event Date	Date:
MM Status	X-Mms-MM-Status-Code

Table XX: Mapping MM1_read_reply_recipient.REQ -> MM4_read_reply_report.REQ

Information elements in MM1_read_reply_recipient.REQ	STD11 Header fields in Egress MM4_read_reply_report.REQ
Recipient address	From:
Originator address	To:
Message-ID	X-Mms-Message-ID:
Date and Time	Date:
Read Status	X-Mms-Read-Status:

Table XX: Mapping MM1_ read_reply_originator.REQ <- MM4_ read_reply_report.REQ

Information elements in MM1_read_reply_originator.REQ	Ingress STD11 Header fields in MM4_read_reply_report.REQ
Recipient address	From:
Originator address	To:
Message-ID	X-Mms-Message-ID:
Date and Time	Date:
Read Status	X-Mms-Read-Status:

3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020265

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **056** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [X] ME/UE [X] Radio Access Network [ ] Core Network [ ]

Title:	⌘	MMS UA behaviour with respect to handling MMS parameters on the USIM
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	February 13, 2002
Category:	⌘	**B**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	The MMS-related information storage possibilities on the USIM have been identified as important. These MMS parameters include the MMS access parameters, the MMS user preferences and the MMS notifications.
Summary of change:	⌘	This CR reflects the support for MMS in the USIM specificatons, 3GPP TS 31.102, and clarifies the MMS User Agent behaviour with respect to the handling of MMS-related information on the USIM.
Consequences if not approved:	⌘	1) Consistency issues between the MMS specifications, 3GPP TS 23.140 and the USIM specifications, 3GPP TS 31.102 2) The MMS User Agent behaviour would not be defined 3) Interoperability issues when a user changes his/her terminal

Clauses affected:	⌘	2, 5.1.1, 7.1.X (new section)		
Other specs Affected:	⌘	[X] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘	3GPP TS 31.102
Other comments:	⌘			

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
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[3] WAP Forum: "Wireless Application Environment Specification, Version 1.2", WAP-WAESpec-19991104, . URL: http://www.wapforum.org/.

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[7] The Unicode Consortium: "The Unicode Standard", Version 2.0, Addison-Wesley Developers Press, 1996.URL: http://www.unicode.org/.

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[15] MIDI Manufacturers Association Incorporated, Los Angeles, California: “MIDI Sample Dump Standard (SDS)”; URL: http://www.midi.org.

[16] ISO/IEC 14496-2:1999/FDAM4, ISO/IEC JTC1/SC 29/WG11 N3904, Pisa, January, 2001

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[20] ITU-T Recommendation H.263 (1998): "Video coding for low bit rate communication".

[21] ITU-T Recommendation H.263 (1998): "Video coding for low bit rate communication - Annex X, Profiles and Levels Definition"

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[24] WAP Forum (November 1999): "WAP Push Access Protocol", WAP-PAP-19991108, URL: http://www.wapforum.org/.

[25] WAP Forum (November 1999): "WAP User Agent Profile Specification", WAP-UAProf-19991110, URL: http://www.wapforum.org/.

[26] W3C Recommendation 22 February 1999 "Resource Description Framework (RDF) Model and Syntax Specification", URL: http://www.w3.org/TR/REC-rdf-syntax.

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[32] ITU-T Recommendation T.30 (1996): "Procedures for document facsimile transmission in the general switched telephone network".

[33] IETF; RFC 2421 (Sept. 1998): "Voice Profile for Internet Mail – version 2, VPIM" , URL: http://www.ietf.org/rfc/rfc2421.txt.

[34] IETF; STD 0053 (RFC 1939): "POP 3, Post Office Protocol - Version 3" , URL: http://www.ietf.org/rfc/rfc1939.txt.

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[36] Adobe Systems: "Tag Image File Format (TIFF), Version 6", URL:, http://www.adobe.com.

[37] 3GPP TR 23.039: "Interface protocols for the connection of Short Message Service Centres (SMSCs) to Short Message Entities (SMEs)".

[38] ISO/IEC TR 13818-5:1997/Amd 1:1999 "Advanced Audio Coding (AAC)"

[39] IETF; Internet draft: "RTP payload format and file storage format for AMR and AMR-WB audio"; URL: http://search.ietf.org/internet-drafts/draft-ietf-avt-rtp-amr-10.txt..

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[41] 3GPP TS 26.234: "End-to-end transparent streaming Service (PSS); Protocols and Codecs".

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[43] WAP Forum: "Wireless profiled TCP", WAP-225-TCP-20010331-a, URL: http://www.wapforum.org

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[47] IETF; RFC 2049: "Multipurpose Internet Mail Extensions (MIME) Part Five: Conformance Criteria and Examples", URL: http://www.ietf.org/rfc/rfc2049.txt.

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[53] IETF; RFC 1327: "Mapping between X.400(1988)/ISO 10021 and RFC 822", URL: http://www.ietf.org/rfc/rfc1327.txt.

[54] 3GPP TS 29.061: "Interworking between the Public Land Mobile Network (PLMN) supporting Packet Based Services and Packet Data Networks (PDN)"

[55] WAP-183-ProvCont, Provisioning Content, URL: http://www.wapforum.org

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[57] 3GPP TS 31.102 "Characteristics of the USIM Application".

5.1 MMS User Agent

5.1.1 MMS User Agent operations

The MMS User Agent shall provide the following application layer functionalities:-

- the retrieval of MMs (initiate MM delivery to the MMS User Agent).

The MMS User Agent may provide additional application layer functionalities such as:-

- the MM composition
- the MM submission
- the MM presentation;

- the presentation of notifications to the user;
- the signing of an MM on an end-user to end-user basis;
- the decryption and encryption of an MM on an end-user to end-user basis;
- all aspects of storing MMs on the terminal;
- handling of MMS-related information on the USIM, if the USIM supports MMS;
- the handling of external devices;
- the user profile management.

This optional list of additional functionalities of the MMS User Agent is not exhaustive.

7 MMS Service Behaviour Description

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7.1.X Handling of MMS-related information on the USIM

If the USIM according to [57] stores MMS related information , an MMS User Agent may be able to handle that MMS-related information on the USIM which comprises:

- MMS connectivity information, as defined in Annex F,
- MMS user preferences, as defined in Annex F, and
- MMS notifications.

MMS connectivity information, which is stored on the USIM, should be used by an MMS User Agent to connect to the network for the purpose of accessing the MMS Relay/Server. When conflicting MMS connectivity information is stored on both the USIM and outside the USIM, the MMS connectivity information stored on the USIM should be used by an MMS User Agent to connect to the network.

MMS user preferences information, which is stored on the USIM, may beused by an MMS User Agent for user assistance in preparation of terminal-originated MMs (e.g. default values for parameters that are often used).

MMS notifications, may be stored on the USIM together with an associated status by a recipient MMS User Agent.

- When an MMS User Agent has deleted a notification which was stored on the USIM, the associated status should be set to “Free space”
- When an MMS User Agent stores a notification on the USIM, the associated status should be set to “Used space”
- When a recipient MMS User Agent has not handled the notification which is stored on the USIM (e.g. the details of the notification were not shown to the user), the associated status should be set to “notification not read”,
- When a recipient MMS User Agent has handled the notification which is stored on the USIM (e.g. the details of the notification have been shown to the user), the associated status should be set to “notification read”,
- When a recipient MMS User Agent has not retrieved an MM based on the notification which is stored on the USIM, the associated status should be set to “MM not retrieved”,
- When a recipient MMS User Agent has retrieved an MM based on the notification which is stored on the USIM, the notification should be deleted or the associated status may be set to “MM retrieved”,
- When a recipient MMS User Agent has rejected an MM based on the notification which is stored on the USIM, the notification may be deleted or the associated status may be set to “MM rejected”,
- When a recipient MMS User Agent has forwarded an MM based on the notification which is stored on the USIM, the notification may be deleted or the associated status should be set to “MM forwarded”,

Upon an attempt to store a notification on a USIM, an MMS User Agent should ensure that the notification is not lost unless the USIM acknowledges the storage attempt to be successful.

3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020263

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **055** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	**Functional Description and Abstract Messages for MM7 realization**
Source:	⌘	**T2**
Work item code:	⌘	**Mess5-MMS**
Date:	⌘	**February 13, 2002**
Category:	⌘	**B**
Release:	⌘	**REL-5**

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	MM7 reference point defines the interworking between a VASP and the MMS Relay/Server. Before defining an actual protocol or API, it is required to define the actual functionality and abstract messages of MM7. This CR deals with these issues
Summary of change:	⌘	1. Text change in section 6.9 defines the functionality of MM7 in general 2. Changes in sections 7.1.5 and 7.1.6 to include VASP into delivery-report and read-reply considerations 3. New section 7.1.11 on the full functionality of VASP support Completion of section 8.7 functionality of MM7
Consequences if not approved:	⌘	Lack of functionality definition of MM7 that is a work item for Release 5

Clauses affected:	⌘	Sections 6.9, 7.1.5, 7.1.6, 7.1.11, 8.7
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

2 References

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[33] IETF; RFC 2421 (Sept. 1998): "Voice Profile for Internet Mail – version 2, VPIM" , URL: http://www.ietf.org/rfc/rfc2421.txt.

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[37] 3GPP TR 23.039: "Interface protocols for the connection of Short Message Service Centres (SMSCs) to Short Message Entities (SMEs)".

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[45] IETF; RFC 2047: "Multipurpose Internet Mail Extensions (MIME) Part Three: Message Header Extensions for Non-ASCII-Text", URL: http://www.ietf.org/rfc/rfc2047.txt.

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3.1 Definitions

For the purposes of the present document, the terms and definitions defined in 3GPP TR 21.905 [2] and 3GPP TS 22.140 [1] and the following apply:

Abstract message: information which is transferred between two MMS entities used to convey an MM and/or associated control information between these two entities

NOTE 1: The application protocol framework and technical realisation of MMS service features is described in terms of abstract messages in the present document.

Delivery Report: feedback information provided to an originator MMS User Agent by an MMS Relay/Server about the status of the delivery of an MM

External Server: network entity/application of an external system such as Internet email, unified messaging system or facsimile to which MMs may be sent to and/or from which MMs may be received by an MMS User Agent via an MMS service provider

NOTE 2: An External Server is connected to that MMS Service Provider via non-MMS-specific protocols.

Forwarding MMS User Agent: MMS User Agent that is the intended recipient of an MM, that requests forwarding of the MM for delivery to other recipient(s) without having to first download the MM

Forwarded MM: MM originally sent from a sender to an intended recipient which is then forwarded to other recipient(s) and to which a delivery report and/or read-reply report may refer and which may be subject to further forwarding

MM Delivery: act of a recipient MMS Relay/Server delivering an MM to a recipient MMS User Agent

MM Submission: act of an originator MMS User Agent submitting an MM to the originator MMS Relay/Server

MMSNA: Multimedia Messaging Service Network Architecture encompasses all the various elements that provide a complete MMS to a user

MMSE: collection of MMS-specific network elements under the control of a single administration

MMS Relay/Server: MMS-specific network entity/application that is under the control of an MMS service provider

NOTE 3: An MMS Relay/Server transfers messages, provides operations of the MMS that are specific to or required by the mobile environment and provides (temporary and/or persistent) storage services to the MMS.

MMS User Agent: application residing on a UE, an MS or an external device that performs MMS-specific operations on a user's behalf

NOTE 4: An MMS User Agent is not considered part of an MMSE.

MMS VAS Applications: Applications providing Value Added Services (e.g. news service or weather forecasts) to MMS users.

Original MM: (initial) MM sent from a sender to a recipient and to which a delivery report and/or a read-reply report and/or a reply-MM may refer and/or which may be subject to being forwarded

Originator MMSE: MMSE associated with the sender of an MM

Originator MMS Relay/Server: MMS Relay/Server associated with the sender of an MM

Originator MMS User Agent: MMS User Agent associated with the sender of an MM

Originator VASP: VASP which is sending an MM

Read-Reply Report: feedback information to an originator MMS User Agent by a recipient MMS User Agent about the status of handling/rendering of an original MM in a recipient MMS User Agent

Recipient MMSE: MMSE associated with the recipient of an MM

Recipient MMS Relay/Server: MMS Relay/Server associated with the recipient of an MM

Recipient MMS User Agent: MMS User Agent associated with the recipient of an MM

Recipient VASP: VASP which is receiving an MM

Reply-MM: the first reply accepted by the recipient MMS Relay/Server (after checking the reply charging limitations, such as the latest time of submission)in case of reply-charging

Transaction: message pair sent between an MMS User Agent and MMS Relay/Server, or between MMS Relay/Servers

…

6.9 MM7: MMS Relay/Server – MMS VAS Applications

Reference point MM7 is used to transfer MMs from MMS Relay/Server to MMS VAS applications and to transfer MMs from MMS VAS applications to MMS Relay/Server. This functionality is further elaborated in section 7.1.11.

This reference point shall be based on existing protocols e.g. SMTP or HTTP for this release of the specification. Future releases may propose a mandatory protocol and encoding schemes. The service provider may decide to use an encoding format in this reference point, which uses the encoding implementation used in the MM1 reference point.

…

7.1.5 Delivery Report

The MMS Relay/Server shall support the delivery reporting service. Delivery reports shall only be generated for MMs.

The originator MMS User Agent or VASP may be able to request a delivery report for a specific MM.

Within an MM notification or upon MM retrieval the recipient MMS User Agent may receive an indication that a delivery report is requested for the MM.

Within either a response to a notification or a response to an MM's delivery, the recipient MMS User Agent may request a delivery report not to be generated by the MMS Relay/Server. When a VASP has requested the delivery report the MMS Relay/Server must send the delivery report regardless of the MMS User Agent's request.

The originator MMS Relay/Server shall generate a delivery report if a delivery report has been requested by the originator MMS User Agent or VASP

- upon routing forward the MM, in case the peer entity is not known by the MMS Relay/Server
- upon routing forward the MM, in case that originator is VASP

The recipient MMS Relay/Server shall generate a delivery report if a delivery report has been requested by the originator MMS User Agent and if the recipient MMS User Agent did not request a delivery report not to be generated or in any case that a VASP has requested a delivery report

- upon receipt of a response to a notification, in case the MM is rejected by the recipient MMS User Agent
- upon receipt of a forwarding request, in case the MM is forwarded by the recipient MMS User Agent to other MM recipient(s), without prior retrieval.
- upon receipt of a response to an MM's delivery, in case the MM is retrieved by the MM recipient
- upon expiry of the MM, in case the MM is not rejected and not retrieved by the MM recipient before the expiry

The originator MMS User Agent or VASP, i.e. the MMS User Agent or VASP receiving the delivery report, may match the delivery report to the sent MM by retaining the message identification of the sent MM and comparing it to the received delivery report, which shall contain the message identification of the original MM. In case of multiple MM recipients, it is necessary for the originator MMS User Agent or VASP to retain the MM recipient addresses as well, to match the delivery report to the sent MM.

If a delivery report has been requested by the originator MMS User Agent and if the recipient MMS User Agent did not request a delivery report not to be generated, or in any case that the request for the delivery report comes from a VASP, the recipient MMS Relay/Server

- shall generate the delivery report
- shall deliver the delivery report to the originator MMS Relay/Server.
- shall be responsible for the storage of delivery reports in the network until the originator MMS Relay/Server becomes reachable or until the delivery report expires

Within the delivery report the recipient MMS Relay/Server

- shall provide the MM originator address to the originator MMS Relay/Server.
- shall provide the MM recipient address to the originator MMS Relay/Server.
- shall provide the identification of the original MM for which the delivery report has been generated to the originator MMS Relay/Server.

- shall provide status information how the MM was handled (e.g. expired, rejected, delivered, forwarded or indeterminate) to the originator MMS Relay/Server
- shall provide a time stamp when the MM was handled to the originator MMS Relay/Server

For each MM recipient of the original MM for which the delivery report has been generated and becomes available at the originator MMS Relay/Server, the originator MMS Relay/Server

- shall deliver the delivery report to the originator MMS User Agent (i.e. the recipient MMS User Agent of the delivery report) or VASP.

Within the delivery report the originator MMS Relay/Server

- shall provide the MM recipient's address to the originator MMS User Agent (the recipient MMS User Agent of the delivery report) or VASP.
- shall provide the identification of the original MM for which the delivery report has been generated to the originator MMS User Agent (the recipient MMS User Agent of the delivery report) or VASP.
- shall ~~be responsible for the~~ store~~age of~~ delivery reports ~~in the network~~ until the originator MMS User Agent becomes reachable (e.g. user moves back into coverage, switches MMS User Agent on) or until the delivery report expires
- should store delivery reports until the VASP becomes reachable (e.g. in case of transport failure towards the VASP) or until the delivery report expires

7.1.6 Read-Reply Report

The MMS Relay/Server shall support the read-reply reporting service. Read-reply reports shall only be generated for MMs.

Upon MM submission the originator MMS User Agent or VASP may be able to request a read-reply report for a specific MM.

Upon MM retrieval the recipient MMS User Agent may receive an indication that a read-reply report is requested for the MM.

After having handled/rendered the MM the recipient MMS User Agent may generate a read-reply report if requested by the originator (MMS User Agent or VASP) and if the originator ~~MMS User Agent~~ address (MMS User Agent or VASP address) is available.

The originator MMS User Agent or VASP, i.e. the MMS User Agent or VASP receiving the read-reply report, may match the read-reply report to the sent MM by retaining the message identification of the sent MM and comparing it to the received read-reply report, which shall contain the message identification of the original MM. In case of multiple MM recipients, it is necessary for the originator MMS User Agent or VASP to retain the MM recipient addresses as well as to match the read-reply report to the sent MM.

If a read-reply report has been requested by the originator MMS User Agent or VASP and if the recipient MMS User Agent supports the read-reply feature and if the recipient allows its creation the recipient MMS User Agent shall submit the read-reply report to the recipient MMS Relay/Server at the earliest opportunity.

NOTE: Since the MM recipient has the right to deny this service not receiving a read-reply report does not mean the message has not been rendered.

A read-reply report:

- shall contain the MM originator's address
- shall contain the MM recipient's address
- shall contain the message identification of the original MM for which the read-reply report has been generated.
- shall provide status information how the MM was rendered (e.g. read, deleted without being read)
- shall provide a time stamp for when the MM was rendered

The recipient MMS User Agent shall be responsible for the storage of read-reply reports in the UE until the recipient MMS Relay/Server becomes reachable (subject to support of the read-reply reporting service by the recipient MMS User Agent and storage place being available).

Upon reception of a read-reply report from a recipient MMS User Agent the recipient MMS Relay/Server

- may provide a time stamp for the read-reply report, i.e. it may also override the MMS User Agent's time stamp,
- shall pass the MM originator address unaltered when routing the read-reply report towards the originator MMS User Agent or originator VASP (i.e. the recipient MMS User Agent or recipient VASP of the read reply report)
- shall insert the MM recipient's address into the read-reply report if not yet provided
- may override the address provided by the recipient MMS User Agent in the read-reply report (subject to MMS service provider's preferences)
- is responsible for resolving the MM originator's address,
- is responsible to route the read-reply report towards the originator MMS User Agent or originator VASP of the original MM.

A special case is where the recipient MMS Relay/Server is also the originator MMS Relay/Server. In this case the MM does not have to be routed forward.

…

7.1.11 Support for Value Added Services (VAS) in MMS

The MMS Relay/Server may support services, in addition to user-to-user messaging, that are either provided by the MMS operator or by third-party Value Added Service Providers (VASP). Examples of services that may be provided as:

- Messages that originate from the VASP to a single or mass-distribution of recipients.
- Messages that originate from a MMS Relay/Server to the VASP that may generate a VASP reply or a new MM submission.

Note: MMS Relay/Server may receive multimedia message from MM1, MM3, MM4 or MM7 Reference points before routing forward message to the VASP. Messages originated from the VASP may be targeted to the recipient via MM1, MM3, MM4 or MM7 Reference points. In a case of the recipient or the originator is outside a single MMSE (outside MMSE to which VASP is connected) special functionalities are not specified in this release (e.g. the recipient MMS User Agent may deny generating Delivery report). Future releases may expand this support across multiple MMSEs.

7.1.11.1 Authentication

MM7 should use transport layer security mechanisms to authenticate the VASP in this release.

For example, if HTTP is used as an MM7 transport, many optional authentication mechanisms are available. The MMS Relay/Server or the VASP may use the mechanisms defined in [57]," basic" and "digest" authentication to authenticate the VASP during each session established for message submission. Each VASP may send a VASP ID and a password before any transactions will be allowed by the MMS Relay/Server. For additional security, HTTP may be carried over a TLS [58] session to the MM7 interface.

Alternatively, authentication mechanisms based on public/private key cryptography and certificates may also be used. Key management is out of scope for this release.

The VASP may authenticate the MMS Relay/Server using similar mechanisms.

7.1.11.2 Authorisation

The MMS Relay/Server should authorise the VAS to send MM to the MMS UA. The authorisation shall be completed during each session established by the VAS. For example, if the VAS attempts to send a MM to the MMS Relay/Server when the VAS is not authorized, then the MMS Relay/Server should not permit the operation .

7.1.11.3 Confidentiality

The interface between MMS Relay/server and VASP may be carried over an encrypted and secure bearer, e.g. HTTP over SSL or TLS, or by use of application-layer encryption. This is an optional feature and may be further elaborated in future releases.

7.1.11.4 Charging Information

VASP may provide service codes that contain billing information that may be transferred to the MMS Relay/Server and passed directly to the billing system without intervention.

…

8.7 Technical realisation of MMS on reference point MM7

~~This clause may be specified further in future releases.~~

The MMSE may support Value Added Services in addition to the basic messaging services defined for MMS. These Value Added Services may be provided by the network operator of the MMSE or by third-party Value Added Service Providers (VASP). This clause defines the interworking between the MMS Relay/Server and the VASP.

The following figure illustrates an example data-flow of the message exchange involved in a VAS distribution of a MM as outlined by the abstract messages specified here:

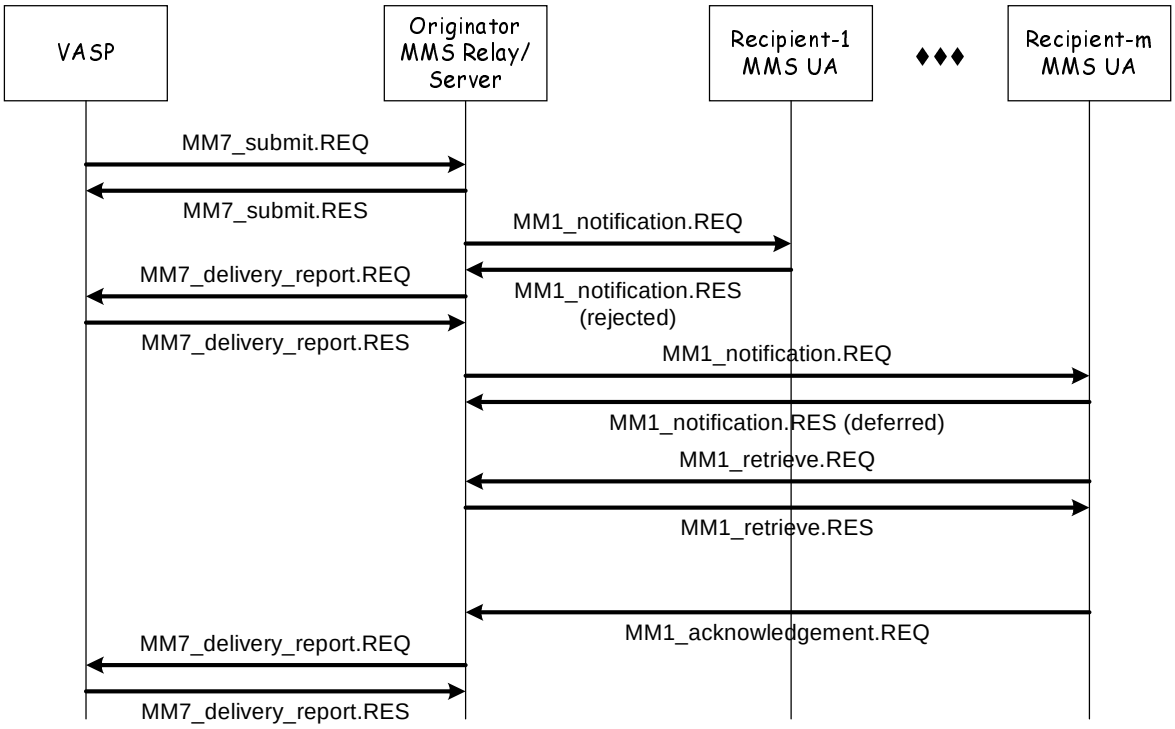

Figure 1. Sample data flow of MM7 message distribution

Subsequent sub-clauses will specify the abstract messages that will define the MM7 protocol.

8.7.1 Submitting a VAS MM

This section addresses the operations necessary for a VASP to provide the service by sending a multimedia message to one or more subscribers or to a distribution list. The involved abstract messages are outlined in Table 36 from type and direction points of view.

Table 36: Abstract messages for submitting VAS message

Abstract messages	Type	Direction
MM7_submit.REQ	Request	VASP -> MMS Relay/Server
MM7_submit.RES	Response	MMS Relay/Server -> VASP

8.7.1.1 Normal Operation

The VASP submits a message to the MMS Relay/Server by sending the MM7_submit.REQ supplying the multimedia message (MM) as the payload of the message. The message may be directed to one or more subscribers or to a distribution list. If the MMS Relay/Server accepts the submission, the MMS Relay/Server must send a MM7_submit.RES with a "success" status. This in no way indicates that the MM was actually delivered to the destinations but states that the request has been accepted.

Support for MM7_submit.REQ and MM7_submit.RES is mandatory for all MMS Relay/Servers that support MM7.

8.7.1.2 Abnormal Operation

The MMS Relay/Server should reject the MM7_submit.REQ if the VAS cannot be authorized or if the parameters of the request exceed the service level for the service being employed. Similarly, if none of the destinations can be

resolved then the response status should indicate an error. If one or several (but not all) addresses can be resolved, the MMS Relay/Server should deliver the message to those addresses and respond to the VAS using the MM7_submit.RES with a partial success to the VASP. Partial success does not indicate that the MM was actually delivered to the destinations but states that the request has been at least partially accepted.

8.7.1.3 Features

Authorisation: The VASP must supply its own identifier or the VAS identifier as part of the request.

Addressing: The VASP may direct the MM to a one or more subscribers or to a distribution list. The originator of a submitted MM may be indicated in addressing-relevant information field(s) of the MM7_submit.REQ

Version: The MM7 protocol shall provide unique means to identify the version supported by both the MMS Relay/Server and VASP.

Message Type: The type of message used on reference point MM7 indicating MM7_submit.REQ and MM7_submit.RES as such.

Transaction Identification: The VASP shall provide an unambiguous transaction identification within an MM7_submit.REQ. The MM7_submit.RES shall unambiguously refer to the corresponding MM7_submit.REQ using the same transaction identification.

Linked message identification: The VASP will supply a message identifier when submitting a message, that defines a correspondence to a previous message that was delivered by the MMS Relay/Server to the VASP

Message class, priority, and subject: The VASP may qualify the MM further by adding a message class, a priority and/or subject to the MM7_submit.REQ.

Service code: The VASP may mark the content of the message with a service code that may be transferred by the MMS Relay/Server in the form of charging information for use by the billing system to properly bill the user for the service being supplied.

Time stamping: The VASP may time stamp the MM.

Time constraints: The VASP may request an earliest desired time of delivery of the MM. The VASP may request a time of expiry for the MM

Reply-Charging: The originator VASP may indicate that it wants to pay for a reply-MM and convey the reply-charging limitations (e.g. the latest time of submission and/or the maximum size of a reply-MM) in the MM7_submit.REQ.

Delivery reporting: The VASP may request a delivery report for the MM

Read reporting: The VASP may request a read-reply report when the user has viewed the MM.

Content adaptation restriction: The VASP may request that the content of the MM will not be subjected to content adaptation.

Content type: The MIME type of the multimedia content shall always be identified in the MM7_submit.REQ.

Content: The VASP may add content in the MM7_submit.REQ.

Message identification: The MMS Relay/Server shall always provide a message identification for an MM, which it has accepted for submission in the MM7_submit.RES.

Request status: The MMS Relay/Server shall indicate the status of the MM7_submit.REQ in the associated MM7_submit.RES. The reason code given in the status information element of the MM7_submit.RES may be supported with an explanatory text further qualifying the status.

8.7.1.4 Information Elements

Table 37: Information elements in the MM7_submit.REQ .

Information element	Presence	Description
Transaction ID	Mandatory	The identification of the MM7_submit.REQ/ MM7_submit.RES pair.
Message type	Mandatory	Identifies this message as a MM7_submit request.
MM7 version	Mandatory	Identifies the version of the interface supported by the VASP
VASP ID	Optional	Identifier of the VASP for this MMS Relay/Server.
VAS ID	Optional	Identifier of the originating application.
Sender address	Optional	The address of the MM originator.
Recipient address	Mandatory	The address of the recipient MM. Multiple addresses are possible or the use of the alias that indicates the use of a distribution list.
Service code	Optional	Information supplied by the VASP which may be included in charging information. The syntax and semantics of the content of this information are out of the scope of this specification.
Linked ID	Optional	This identifies a correspondence to a previous valid message delivered to the VASP.
Message class	Optional	Class of the MM (e.g. advertisement, information service, accounting)
Date and time	Optional	The time and date of the submission of the MM (time stamp).
Time of Expiry	Optional	The desired time of expiry for the MM.
Earliest delivery time	Optional	The earliest desired time of delivery of the MM to the recipient.
Delivery report	Optional	A request for delivery report.
Read reply	Optional	A request for confirmation via a read report to be delivered as described in section 8.1
Reply-Charging	Optional	A request for reply-charging.
Reply-Deadline	Optional	In case of reply-charging the latest time of submission of replies granted to the recipient(s).
Reply-Charging-Size	Optional	In case of reply-charging the maximum size for reply-MM(s) granted to the recipient(s).
Priority	Optional	The priority (importance) of the message.
Subject	Optional	The title of the whole multimedia message.
Adaptations	Optional	Indicates if VASP allows adaptation of the content (default True)
Content type	Mandatory	The content type of the MM's content.
Content	Optional	The content of the multimedia message

Table 38: Information elements in the MM7_submit.RES .

Information element	Presence	Description
Transaction ID	Mandatory	The identification of the MM7_submit.REQ/ MM7_submit.RES pair.
Message type	Mandatory	Identifies this message as a MM7_submit response.
MM7 version	Mandatory	Identifies the version of the interface supported by the MMS Relay/Server
Message ID	Conditional	If status indicates success then this contains the MMS Relay/Server generated identification of the submitted message. This ID may be used in subsequent requests and reports relating to this message.
Request Status	Mandatory	Status of the completion of the submission, no indication of delivery status is implied.
Request Status text	Optional	Text description of the status for display purposes, should qualify the Request Status code.

8.7.2 Delivery Request

This section addresses cases where a message that is passed by the MMS Relay/Server to a VASP for processing. For example, this may include cases where the message originated from the MMS User-Agent.

The involved abstract messages are outlined in Table 44 from type and direction points of view.

Table 44: Abstract messages for demanding a service from a VASP

Abstract messages	Type	Direction
MM7_deliver.REQ	Request	MMS Relay/Server -> VASP
MM7_deliver.RES	Response	VASP -> MMS Relay/Server

8.7.2.1 Normal Operation

The MMS Relay/Server will deliver messages to the VASP by supplying the MM as the payload of the MM7_deliver.REQ. The message originates, for example, from a MMS User Agent, an external application, or from outside the MMSE. This delivery may include an identification of the request that may be used by the VASP to correlate a response to the message. The VASP should reply with a MM7_deliver.RES message indicating that the message has been successfully received and will be processed.

The following figure illustrates the data flow of a use case where a MMS User Agent requesting a service from a VAS that requires a response.

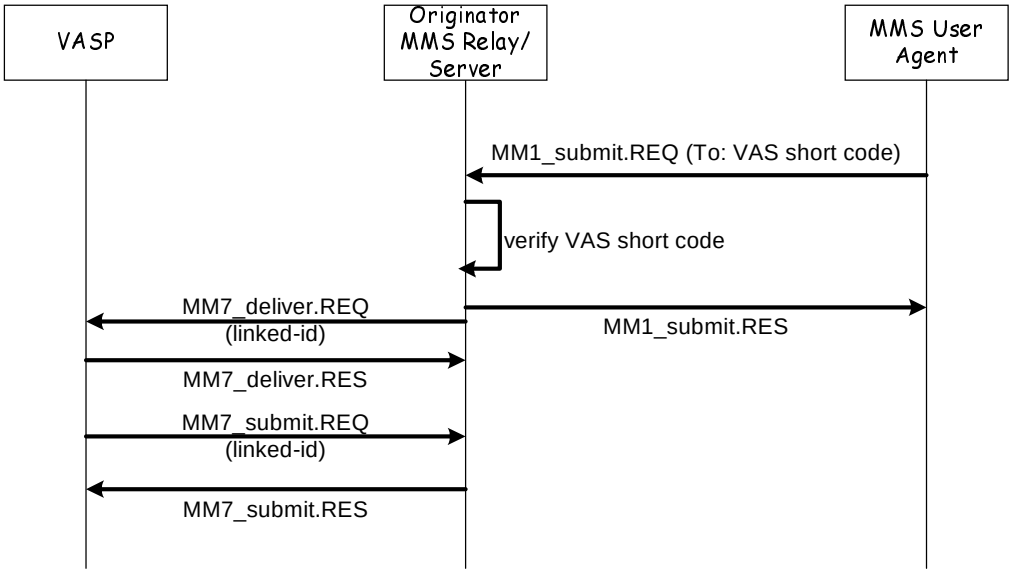

Figure 2. Use of MM7_deliver and subsequent response

Support for MM7_deliver.REQ and MM7_deliver.RES is mandatory for a MMS Relay/Server that supports MM7

8.7.2.2 Abnormal Operation

If the VASP cannot identify the requested content then it should indicate the failure in the MM7_deliver.RES status fields.

8.7.2.3 Features

Authentication: The MMS Relay/Server may supply its own identifier as part of the request.

Addressing: All relevant address information for the delivery of the message to the VASP – including the addressing information from the original message and from the MMS Relay/Server should be included in the relevant information elements of MM7_deliver.REQ.

Version: The MM7 protocol shall provide unique means to identify the version supported by both the MMS Relay/Server and VASP.

Message Type: The type of message used on reference point MM7 indicating MM7_deliver.REQ and MM7_deliver.RES as such.

Transaction Identification: The VASP shall provide an unambiguous transaction identification within a request. The response shall unambiguously refer to the corresponding request using the same transaction identification.

Message priority and subject: The MMS Relay/Server may qualify the MM further by adding a priority and/or subject to the MM7_deliver.REQ. This information will originate from the end-user's original request.

Linked message identification: The MMS Relay/Server will supply an identifier for the request that may be used by the VASP.

Service code: The VASP may mark the response to the message with a service code that will be transferred to the charging information for use by the billing system to properly bill the user for the service being supplied.

Time stamping: The MM may include a time stamp indicating the time of original submission.

Reply-Charging: In case of reply-charging when the reply-MM is submitted within the MM7_deliver.REQ MMS Relay/Server should indicate that the message is free-of-charge reply.

Content type: The MIME type of the multimedia content shall always be identified in the MM7_deliver.REQ.

Content: The originator of the MM may supply content that is delivered to the VASP in the MM7_deliver.REQ.

Request status: The MMS Relay/Server shall indicate the status of the request in the associated response. The reason code given in the status information element of the response may be supported with an explanatory text further qualifying the status.

8.7.2.4 Information Elements

Table 45: Information elements in the MM7_deliver.REQ .

Information element	Presence	Description
Transaction ID	Mandatory	The identification of the MM7_deliver.REQ/ MM7_deliver.RES pair.
Message type	Mandatory	Identifies this message as a MM7_deliver request.
MM7 version	Mandatory	Identifies the version of the interface supported by the MMS Relay/Server
MMS Relay/Server ID	Optional	Identifier of the MMS Relay/Server
Linked ID	Optional	Identifier that may be used by the VASP in a subsequent MM7_submit.REQ
Sender address	Mandatory	The address of the MM originator.
Recipient address	Optional	The address(es) of the intended recipients of the subsequent processing by the VASP or the original recipient address(es).
Date and time	Optional	The time and date of the submission of the MM (time stamp).
Reply-Charging-ID	Optional	In case of reply-charging when the reply-MM is submitted within the MM7_deliver.REQ this is the identification of the original MM that is replied to.
Priority	Optional	The priority (importance) of the message.
Subject	Optional	The title of the whole MM.
Content type	Mandatory	The content type of the MM's content.
Content	Optional	The content of the multimedia message

Table 46: Information elements in the MM7_deliver.RES .

Information element	Presence	Description
Transaction ID	Mandatory	The identification of the MM7_deliver.REQ/ MM7_deliver.RES pair.
Message type	Mandatory	Identifies this message as a MM7_deliver response.
MM7 version	Mandatory	Identifies the version of the interface supported by the VASP
Service code	Optional	Information supplied by the VASP which may be included in charging information. The syntax and semantics of the content of this information are out of the scope of this specification.
Request Status	Mandatory	Status of the completion of the request.
Request Status text	Optional	Text description of the status for display purposes, should qualify the Request Status code

8.7.3 Cancel and replace of MM

This section details the requests that should be supported in MM7 to allow a VASP to control or change the distribution of a message. These operations will allow the VASP to cancel a submitted message prior to delivery or replace a submitted message with a new message.

The involved abstract messages are outlined in Table 39 from type and direction points of view.

Table 39: Abstract messages for controlling Distribution MM

Abstract messages	Type	Direction
MM7_cancel.REQ	Request	VASP -> MMS Relay/Server
MM7_cancel.RES	Response	MMS Relay/Server -> VASP
MM7_replace.REQ	Request	VASP -> MMS Relay/Server
MM7_replace.RES	Response	MMS Relay/Server -> VASP

The following figure illustrates the interaction between the different MMS entities in canceling a VASP message.

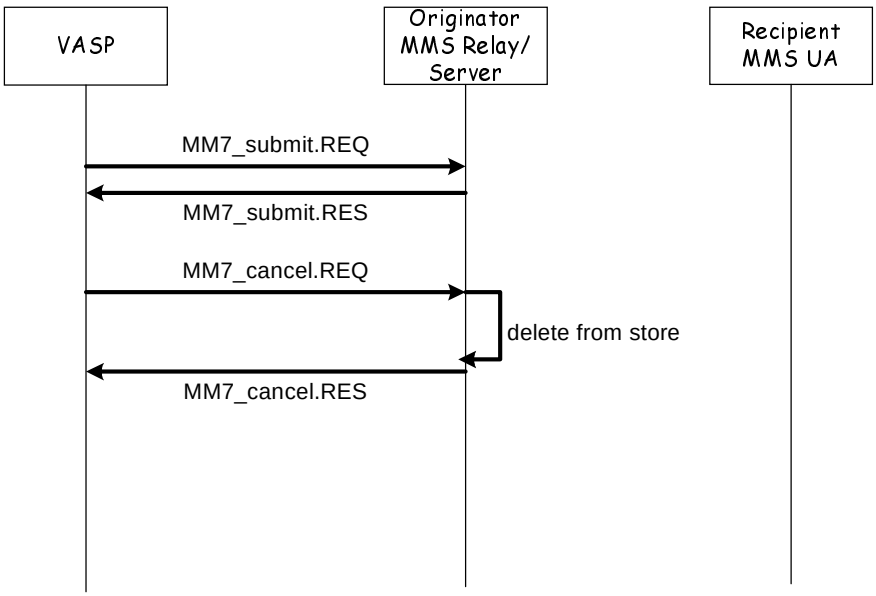

Figure 3. Data flow of VASP canceling a submitted message

8.7.3.1 Normal Operation

If the VASP has decided to cancel the delivery of a MM that it has already submitted, then the VASP should indicate this by sending the MM7_cancel.REQ message to the MMS Relay/Server. The MMS Relay/Server should check the status of the message indicated by the Message ID and cancel delivery to all destinations for which the MMS Relay/Server has not sent out a notification. The MMS Relay/Server should respond to the request with a MM7_cancel.RES indicating that the request was processed.

If the VASP has new content that it wishes to submit in place of the content that was originally submitted it should submit the new replacement content using the MM7_replace.REQ message. The MMS Relay/Server should check the status of the message indicated by the Message ID and replace the message content for all destinations that have not retrieved or forwarded the message as yet. The MMS Relay/Server should redistribute the new content to the destination list from the original MM7_submit.REQ. Optional information elements that appear in the MM7_replace.REQ message shall replace the corresponding information elements of the original submission (the VASP shall not replace information elements that were already provided in the previously sent notification), information elements that do not appear in the MM7_replace.REQ message shall retain the original submission values. Replacement of messages that have been retrieved may be specified in future releases.

Support for MM7_cancel.REQ, MM7_cancel.RES, MM7_replace.REQ, and MM7_replace.RES is optional for all MMS Relay/Server that support MM7

8.7.3.2 Abnormal Operation

The MMS Relay/Server should reject a request to cancel or replace a message if it is unable to authorise the VAS to cancel or replace MMs, or find the Message ID indicated in the request, or cannot determine that the indicated message was originally submitted by the VASP.

8.7.3.3 Features

Authorisation: The VASP must supply its own identifier or the VAS identifier as part of the request.

Addressing: When replacing a previously sent message the replacement shall be addressed to the same recipients as the original being replaced.

Version: The MM7 protocol shall provide unique means to identify the version supported by both the MMS Relay/Server and VASP.

Message type: The type of message used on reference point MM7 indicating MM7_cancel.REQ, MM7_cancel.RES, MM7_replace.REQ, and MM7_replace.RES as such.

Transaction identification: The VASP shall provide an unambiguous transaction identification within a request. The response shall unambiguously refer to the corresponding request using the same transaction identification.

Service code: The VASP may mark the content of the message with a service code that may be transferred by the MMS Relay/Server in the form of charging information for use by the billing system to properly bill the user for the service being supplied.

Time stamping: The VASP may time stamp the MM.

Time constraints: The VASP may also request the earliest desired time of delivery of the MM to be changed.

Read reporting: The VASP may request a read-reply report when the user has viewed the MM.

Content adaptation restriction: The VASP may request that the content of the MM will not be subjected to content adaptation.

Content type: The MIME type of the multimedia content shall always be identified in the MM7_replace.REQ if content is replaced.

Content: The VASP may add content in the MM7_replace.REQ.

Message identification: The MMS Relay/Server shall always provide a message identification for an MM, which it has accepted for submission in either the MM7_replace.REQ or in the MM7_cancel.REQ. The VASP shall supply this

message identification when requesting to cancel or replace a previously submitted message. When replacing a MM the updated message retains the identification of the original (replaced) message.

Request status: The MMS Relay/Server shall indicate the status of the request in the associated response. The reason code given in the status information element of the response may be supported with an explanatory text further qualifying the status.

8.7.3.4 Information Elements

Table 40: Information elements in the MM7_cancel.REQ .

Information element	Presence	Description
Transaction ID	Mandatory	The identification of the MM7_cancel.REQ/ MM7_cancel.RES pair.
Message type	Mandatory	Identifies this message as a MM7_cancel request.
MM7 version	Mandatory	Identifies the version of the interface supported by the VASP
VASP ID	Optional	Identifier of the VASP for this MMS Relay/Server.
VAS ID	Optional	Identifier of the originating application.
Sender address	Optional	The address of the MM originator.
Message ID	Mandatory	Identifier of the message to cancel.

Table 41: Information elements in the MM7_cancel.RES .

Information element	Presence	Description
Transaction ID	Mandatory	The identification of the MM7_cancel.REQ/ MM7_cancel.RES pair.
Message type	Mandatory	Identifies this message as a MM7_cancel response.
MM7 version	Mandatory	Identifies the version of the interface supported by the MMS Relay/Server
Request Status	Mandatory	Status of the completion of the request.
Request Status text	Optional	Text description of the status for display purposes, should qualify the Request Status code

Table 42: Information elements in the MM7_replace.REQ .

Information element	Presence	Description
Transaction ID	Mandatory	The identification of the MM7_replace.REQ/ MM7_replace.RES pair.
Message type	Mandatory	Identifies this message as a MM7_replace request.
MM7 version	Mandatory	Identifies the version of the interface supported by the VASP
VASP ID	Optional	Identifier of the VASP for this MMS Relay/Server.
VAS ID	Optional	Identifier of the originating application.
Message ID	Mandatory	Identifier of the message that current message replaces.
Service code	Optional	Information supplied by the VASP which may be included in charging information. The syntax and semantics of the content of this information are out of the scope of this specification.
Date and time	Optional	The time and date of the submission of the MM (time stamp).
Earliest delivery time	Optional	The earliest desired time of delivery of the MM to the recipient.
Read reply	Optional	A request for confirmation via a read report to be delivered as described in section 8.1
Adaptations	Optional	Indicates if VASP allows adaptation of the content (default True)
Content type	Conditional	The content type of the MM's content. If the Content IE appears, then the Content type IE must appear.
Content	Optional	The content of the multimedia message

Table 43: Information elements in the MM7_replace.RES.

Information element	Presence	Description
Transaction ID	Mandatory	The identification of the MM7_replace.REQ/ MM7_replace.RES pair.
Message type	Mandatory	Identifies this message as a MM7_replace response.
MM7 version	Mandatory	Identifies the version of the interface supported by the MMS Relay/Server
Request Status	Mandatory	Status of the completion of the request.
Request Status text	Optional	Text description of the status for display purposes, should qualify the Request Status code

8.7.4 Delivery reporting to VASP

This part of MMS service covers the generation of a delivery report from the MMS Relay/Server to the VASP. The involved abstract messages are outlined in Table 47 from type and direction points of view.

Table 47: Abstract messages for delivery reports to VASP

Abstract Message	Type	Direction
MM7_delivery_report.REQ	Request	MMS Relay/Server -> VASP
MM7_delivery_report.RES	Response	VASP -> MMS Relay/Server

8.7.4.1 Normal Operation

The MMS Relay/Server shall create the MM7_delivery_report.REQ and send it to the VASP when the appropriate information is available.

Support for MM7_delivery_report.REQ and MM7_delivery_report.RES is mandatory for a MMS Relay/Server that supports MM7.

8.7.4.2 Abnormal Operation

In case the VASP cannot identify the MMS Relay/Server or the Message ID is not recognized, then the VASP shall respond with a MM7_delivery_report.RES including a status which indicates the reason the delivery report was not accepted.

8.7.4.3 Features

Addressing: Both the address of the VAS (which is the original MM originator) and the address of the recipient of the original MM shall be provided in the addressing-relevant information fields of MM7_delivery_report.REQ.

Version: The MM7 protocol shall provide unique means to identify the version supported by both the MMS Relay/Server and VASP.

Message Type: The type of message used on reference point MM7 indicating MM7_delivery_report.REQ and MM7_delivery_report.RES as such.

Transaction Identification: The VASP shall provide an unambiguous transaction identification within a request. The response shall unambiguously refer to the corresponding request using the same transaction identification.

Time stamping: The MM7_delivery_report.REQ shall carry the time and date of handling of the MM (e.g. retrieval, expiry, rejection).

Message identification: In the MM7_delivery_report.REQ the MMS Relay/Server shall always provide the original message identification of the MM that the delivery report corresponds to as generated in response to the associated MM7_submit.REQ.

MM Status: The MM7_delivery_report.REQ shall carry the status of the MM delivery, e.g. retrieved, rejected, expired or indeterminate.

Request Status: The VASP shall indicate the status of the MM7_delivery_report.REQ in the associated MM7_delivery_report.RES. The reason code given in the status information element of the response may be supported with an explanatory text further qualifying the status.

8.7.4.4 Information Elements

Table 48: Information elements in the MM7_delivery_report.REQ.

Information element	Presence	Description
Transaction ID	Mandatory	The identification of the MM7_delivery_report.REQ/ MM7_delivery_report.RES pair.
Message Type	Mandatory	The type of message used on reference point MM7 " MM7_delivery_report.REQ".
MM7 Version	Mandatory	The version of MM7 supported by the MMS Relay/Server
MMS Relay/Server ID	Optional	Identifier of the MMS Relay/Server
Message ID	Mandatory	The identification of the original MM.
Recipient address	Mandatory	The address of the recipient of the original MM.
Sender address	Mandatory	The address of the VAS that submitted the original MM.
Date and time	Mandatory	Date and time the MM was handled (retrieved, expired, rejected, etc.)
MM Status	Mandatory	Status of the MM, e.g. retrieved, expired, rejected
Status text	Optional	Text description of the status for display purposes, should qualify the MM Status code

Table 49: Information elements in the MM7_delivery_report.RES.

Information element	Presence	Description
Transaction ID	Mandatory	The identification of the MM7_delivery_report.REQ/ MM7_delivery_report.RES pair.
Message Type	Mandatory	The type of message used on reference point MM7: "MM7_delivery_report.RES".
MM7 Version	Mandatory	The version of MM7 supported by the VASP
Request Status	Mandatory	The status of the associated MM7_delivery_report.REQ.
Request Status text	Optional	Text description of the status for display purposes, should qualify the Request Status code

8.7.5 Read-Reply Report for VASP

This part of MMS service covers the delivery of a read-reply report from the MMS Relay/Server to the VASP. The involved abstract messages are outlined in Table 50 from type and direction points of view.

Table 50: Abstract messages for sending and receiving read-reply reports in MM7

Abstract messages	Type	Direction
MM7_read_reply.REQ	Request	MMS Relay/Server -> VASP
MM7_read_reply.RES	Response	VASP -> MMS Relay/Server

8.7.5.1 Normal Operation

If the VASP requested a read-reply report then the recipient MMS User Agent may create and send a read-reply to the MMS Relay/Server. The MMS Relay/Server must identify that this read-reply report is associated with a MM originating from the MM7 reference point and must create the MM7_read_reply.REQ and send it to the VASP. The VASP shall return a MM7_read_reply.RES that reflects the successful reception of the read-reply report.

Support for MM7_read_reply_report.REQ and MM7_read_reply_report.RES is optional for a MMS Relay/Server that supports MM7.

8.7.5.2 Abnormal Operation

In case the VASP cannot identify the MMS Relay/Server or the Message ID is not recognized, then the VASP shall respond with a MM7_read_reply.RES including a status which indicates the reason the read reply report was not accepted.

8.7.5.3 Features

Addressing: Both, the address of the VASP (which is the MM originator), and the address of the originator (which is the MM recipient) of a read-reply report shall be provided in the addressing-relevant information fields of MM7_read_reply_report.REQ.

Version: The MM7 protocol shall provide unique means to identify the version supported by both the MMS Relay/Server and VASP.

Message Type: The type of message used on reference point MM7 indicating MM7_read_reply.REQ and MM7_read_reply.RES as such.

Transaction Identification: The VASP shall provide an unambiguous transaction identification within a request. The response shall unambiguously refer to the corresponding request using the same transaction identification.

Message identification: In the MM7_read_reply_report.REQ the MMS Relay/Server shall always provide the original message identification of the MM that the read-reply report corresponds to as generated for the MM7_submit.RES.

Time Stamping: The MM7_read_reply_report.REQ shall carry the time-stamp associated with the read-reply report**.**

Read Status: The MM7_read_reply_report.REQ shall carry the status of the MM retrieval, e.g. read or deleted without being read.

Request Status: The VASP shall indicate the status of the MM7_read_reply.REQ in the associated MM7_read_reply.RES. The reason code given in the status information element of the response may be supported with an explanatory text further qualifying the status.

8.7.5.4 Information Elements

Table 51: Information elements in the MM7_read_reply_report.REQ.

Information element	Presence	Description
Transaction ID	Mandatory	The identification of the MM7_read_reply_report.REQ/ MM7_read_reply_report.RES pair.
Message Type	Mandatory	Identifies this message as a MM7_read_reply_report request.
MM7 Version	Mandatory	The version of MM7 supported by the MMS Relay/Server.
MMS Relay/Server ID	Optional	Identifier of the MMS Relay/Server
Recipient address	Mandatory	The address of the MM recipient of the original MM, i.e. the originator of the read-reply report.
Sender address	Mandatory	The address of the VASP (originator of the original MM) i.e. the recipient of the read-reply report.
Message-ID	Mandatory	The message ID of the original MM.
Date and time	Mandatory	Date and time the MM was handled (read, deleted without being read, etc.) (time stamp)
Read Status	Mandatory	Status of the MM, e.g. Read, Deleted without being read
Status text	Optional	Text description of the status for display purposes, should qualify the Read Status code

Table 52: Information elements in the MM7_read_reply_report.RES.

Information element	Presence	Description
Transaction ID	Mandatory	The identification of the MM7_read_reply_report.REQ/ MM7_read_reply_report.RES pair.
Message Type	Mandatory	Identifies this message as a MM7_read_reply_report response.
MM7 Version	Mandatory	The version of MM7 supported by the VASP.
Request Status	Mandatory	The status of the associated MM7_read_reply_report.REQ.
Request Status text	Optional	Text description of the status for display purposes, should qualify the Request Status code.

8.7.6 Generic Error Handling

When the MMS Relay/Server or VASP receives a MM7 abstract message that cannot be replied to with the specific response it shall reply using a generic error message as described here. To get a correlation between the original send REQ and the error response, every abstract message on the MM7 reference point shall include a Transaction ID.

The involved abstract messages are outlined in Table 53 from type and direction points of view.

Table 53: Abstract message for generic error notification

Abstract message	Type	Direction
MM7_RS_error.RES	Response	MMS Relay/Server -> VASP
MM7_VASP_error.RES	Response	VASP->MMS Relay/Server

8.7.6.1 Normal Operation

If the MMS Relay/Server has received a message over the MM7 interface and does not recognize the Message Type, or the requested feature is not supported and the normal response message is not supported, then the MMS Relay/Server must generate a MM7_RS_error.RES message to reply to the VASP.

If the VASP has received a message over the MM7 interface and does not recognize the Message Type, or the requested feature is not supported and the normal response message is not supported, then the VASP must generate a MM7_VASP_error.RES message to reply to the MMS Relay/Server.

Support for the MM7_RS_error.RES and MM7_VASP_error.RES is Mandatory for a MMS Relay/Server that supports MM7

8.7.6.2 Features

Version: The MM7 protocol shall provide unique means to identify the version supported by both the MMS Relay/Server and VASP.

Message Type: The type of message used on reference point MM7 indicating MM7_RS_error.RES or MM7_VASP_error.RES as such.

Transaction Identification: The response shall unambiguously refer to the corresponding request using the same transaction identification.

Error Status: The MMS Relay/Server or VASP shall indicate the error condition that caused the generation of the error response. The reason code given in the status information element of the response may be supported with an explanatory text further qualifying the status.

8.7.6.3 Information Elements

Table 54: Information elements in the MM7_RS_error.RES .

Information element	Presence	Description
Transaction ID	Mandatory	Identifier that corresponds to the Transaction ID of the incoming message.
Message type	Mandatory	Identifies this message as a MM7_RS_error response.
MM7 version	Mandatory	Identifies the version of the interface supported by the MMS Relay/Server
Error Status	Mandatory	Error code (e.g. Message type not-supported, MM7 version not supported).
Error Status text	Optional	Text description of the status for display purposes, should qualify the Error Status code.

Table 55: Information elements in the MM7_VASP_error.RES .

Information element	Presence	Description
Transaction ID	Mandatory	Identifier that corresponds to the Transaction ID of the incoming message.
Message type	Mandatory	Identifies this message as a MM7_VASP_error response.
MM7 version	Mandatory	Identifies the version of the interface supported by the VASP
Error Status	Mandatory	Error code (e.g. Message type not-supported, MM7 version not supported).
Error Status text	Optional	Text description of the status for display purposes, should qualify the Error Status code.

8.7.7 Administrating the Distribution List

After a Value Added Service becomes available users may subscribe to the service using direct contact to the VASP (e.g. by sending a MM via MM1_submit.REQ to the service provider including registration information). The distribution list may be maintained by the MMS Relay/Server. The full definition of the administration of the distribution list may be specified in future releases of this specification.

3GPP TSG-T2 #16
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CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **054** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☒ Radio Access Network ☐ Core Network ☒

Title:	⌘	Persistent Networked-Based Storage Functions
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	Feb 13, 2002
Category:	⌘	**B**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	22.140 requires universal access to multimedia messages, and recently has been updated by SA1 to specify that the MMS be able to support requests to store and manage MMs in a persistent, network-based repository. This CR introduces the necessary changes to support the persistent, network-based functions
Summary of change:	⌘	• Introduces the optional feature of MM mailbox, called 'MMBox', and specifies their function *if* they are supported. • Defines the meaning of an "MMBox", MM State, and associated functions. • Amends Sec 3, 5, 7 & 8 chapters as appropriate for MMBoxes. • Defines association between MMS addresses and MMBoxes. Define additional detailed transactions on MM1 for MMBoxes.
Consequences if not approved:	⌘	Fundamental requirements specified by TS 22.140-410 not fulfilled; network-based storage and universal access to MMS not possible.

Clauses affected:	⌘	Sections 3 through 8
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3 Definitions and Abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions defined in 3GPP TR 21.905 [2] and 3GPP TS 22.140 [1] and the following apply:

Abstract message: information which is transferred between two MMS entities used to convey an MM and/or associated control information between these two entities

NOTE 1: The application protocol framework and technical realisation of MMS service features is described in terms of abstract messages in the present document.

Delivery Report: feedback information provided to an originator MMS User Agent by an MMS Relay/Server about the status of the delivery of an MM

External Server: network entity/application of an external system such as Internet email, unified messaging system or facsimile to which MMs may be sent to and/or from which MMs may be received by an MMS User Agent via an MMS service provider

NOTE 2: An External Server is connected to that MMS Service Provider via non-MMS-specific protocols.

Forwarding MMS User Agent: MMS User Agent that is the intended recipient of an MM, that requests forwarding of the MM for delivery to other recipient(s) without having to first download the MM

Forwarded MM: MM originally sent from a sender to an intended recipient which is then forwarded to other recipient(s) and to which a delivery report and/or read-reply report may refer and which may be subject to further forwarding

Message ID: a unique identifier for an MM.

Message Reference: a unique identifier for an MM indicating the location of the MM.

MMBox: network storage associated with a user into which MMs, along with MM State and MM Flags, may be stored, retrieved, and deleted.

MM State: the state of an MM within the MMBox, as one of several, mutually-exclusive enumerated values.

MM Flags: a list of zero, one, or more keyword flags, defined by the MMS User Agent, associated with the MM.

MM Delivery: act of a recipient MMS Relay/Server delivering an MM to a recipient MMS User Agent

MM Submission: act of an originator MMS User Agent submitting an MM to the originator MMS Relay/Server

MMSNA: Multimedia Messaging Service Network Architecture encompasses all the various elements that provide a complete MMS to a user

MMSE: collection of MMS-specific network elements under the control of a single administration

MMS Relay/Server: MMS-specific network entity/application that is under the control of an MMS service provider

NOTE 3: An MMS Relay/Server transfers messages, provides operations of the MMS that are specific to or required by the mobile environment and provides (temporary and/or persistent) storage services to the MMS.

MMS User Agent: application residing on a UE, an MS or an external device that performs MMS-specific operations on a user's behalf

NOTE 4: An MMS User Agent is not considered part of an MMSE.

MMS VAS Applications: Applications providing Value Added Services (e.g. news service or weather forecasts) to MMS users.

Original MM: (initial) MM sent from a sender to a recipient and to which a delivery report and/or a read-reply report and/or a reply-MM may refer and/or which may be subject to being forwarded

Originator MMSE: MMSE associated with the sender of an MM

Originator MMS Relay/Server: MMS Relay/Server associated with the sender of an MM

Originator MMS User Agent: MMS User Agent associated with the sender of an MM

Read-Reply Report: feedback information to an originator MMS User Agent by a recipient MMS User Agent about the status of handling/rendering of an original MM in a recipient MMS User Agent

Recipient MMSE: MMSE associated with the recipient of an MM

Recipient MMS Relay/Server: MMS Relay/Server associated with the recipient of an MM

Recipient MMS User Agent: MMS User Agent associated with the recipient of an MM

Reply-MM: the first reply accepted by the recipient MMS Relay/Server (after checking the reply charging limitations, such as the latest time of submission)in case of reply-charging

Transaction: message pair sent between an MMS User Agent and MMS Relay/Server, or between MMS Relay/Servers

5 Functional Description of Involved MMS Elements

5.1 MMS User Agent

5.1.1 MMS User Agent operations

The MMS User Agent shall provide the following application layer functionalities:-

- the retrieval of MMs (initiate MM delivery to the MMS User Agent).

The MMS User Agent may provide additional application layer functionalities such as:-

- the MM composition
- the MM submission
- the MM presentation;
- the presentation of notifications to the user;
- the signing of an MM on an end-user to end-user basis;
- the decryption and encryption of an MM on an end-user to end-user basis;
- all aspects of storing MMs on the terminal;
- management and presentation of MMBox content;
- the handling of external devices;
- the user profile management.

This optional list of additional functionalities of the MMS User Agent is not exhaustive.

5.1.2 Minimum set of supported formats

Multiple media elements shall be combined into a composite single MM using MIME multipart format as defined in RFC 2046 [6]. The media type of a single MM element shall be identified by its appropriate MIME type whereas the media format shall be indicated by its appropriate MIME subtype.

In order to guarantee a minimum support and compatibility between multimedia messaging capable terminals, the following media and file formats shall be at least supported.

5.1.2.1 Text

Plain text. Any character encoding (charset) that contains a subset of the logical characters in Unicode [7] shall be used (e.g. US-ASCII [8], ISO-8859-1[9], UTF-8[10], Shift_JIS, etc.).

Unrecognised subtypes of "text" shall be treated as subtype "plain" as long as the MIME implementation knows how to handle the charset. Any other unrecognised subtype and unrecognised charset shall be treated as "application/octet - stream".

In order to guarantee SMS interoperability, SMS 3GPP TS 24.011 [11] RP-DATA RPDU encapsulation defined in clause 7.3.1 shall be supported. MIME type "application/x-sms" shall be used for this purpose.

NOTE: SMS MIME type shall be used as soon as the MIME registration has been completed.

5.1.2.2 Speech

MMS User Agents supporting media type Speech shall support AMR [12], organised in the format specified in clauses 6.2 and 6.3 of [39].

5.1.2.3 Still Image

MMS User Agents supporting media type Image shall support Baseline JPEG [17]. The usage of the Baseline JPEG shall follow the technical specifications and the implementation guidelines specified in 26.234 [41].

5.1.2.4 Video

In order to ensure alignment with the codecs specified for Packet Switched Streaming Services [41], ITU-T H.263 baseline [20] shall be supported in MMS User Agents that support media type Video.

5.1.2.5 File Format for dynamic media

To ensure interoperability for the transport of video and associated speech/audio in an MM, the MP4 file format shall be supported. The usage of the MP4 file format shall follow the technical specifications and the implementation guidelines specified in 26.234 [41].

NOTE: 3GPP TS 26.234 [41] specifies a mechanism for the registration of AMR and H.263 codestreams to be included in MP4 files.

5.1.3 Additional suggested codecs

In order to facilitate interoperability with formats widely used e.g. in the Internet community, the optional support of the additional following codecs is suggested:

Media type Audio:-

MP3 [14]

MIDI [15]

AAC [38]

Media type Image:

GIF 89a [18]

Media type Video:

MPEG-4 Visual Simple Profile Level 0 [19] and [16]

H.263 profile 3 level 10, according to [21]

5.2 MMS Relay/Server

The MMS Relay/Server is responsible for storage and notification, reports, and general handling of messages. The MMS Relay/Server may also provide convergence functionality between External Servers and MMS User Agents and thus enable the integration of different server types across different networks. An Example can be found in Annex A.

It is possible to separate the MMS Relay/Server element into MMS Relay and MMS Server elements, but an allocation of the MMS Relay/Server functionalities to such elements is not defined in this release.

The MMS Relay/Server is responsible for the following functions:-

- receiving and sending MM;
- enabling/disabling MMS function;
- personalising MMS based on user profile information;
- MM deletion based on user profile or filtering information;
- media type conversion;
- media format conversion;
- conversion of messages arriving at the recipient MMS Relay/Server from legacy messaging systems to MM format (e.g. facsimile to MM)
- conversion of MMs leaving the originator MMS Relay/Server to legacy messaging systems to the appropriate message format (e.g. MM to internet email)
- message content retrieval;
- MM forwarding;
- screening of MM;
- negotiation of terminal capabilities;
- checking terminal availability;
- MM notification to the MMS User Agent;
- generating delivery reports;
- routing forward MMs and read-reply reports;
- generating call data records (CDR);
- address translation.
- address hiding
- managing the message properties on servers (e.g. voicemail or email server) integrated in the MMSE (consistency)
- temporary and/or persistent storage of messages
- ensuring that messages are not lost until successfully delivered to another MMSE element
- controlling the reply-charging feature of MMS

5.2.1 Persistent Network-based Storage (MMBoxes)

An optional feature of MMS is the support of persistent, network-based storage, called an “MMBox”, a logical entity associated with the MMS Relay/Server into which Multimedia Messages (MMs) may be stored, retrieved, and deleted. Depending upon an operator’s configuration, each subscriber may have her MMBox configured to automatically store incoming and submitted MMs, or, through supporting MMS User Agents, request that specific MMs be persistently stored on a case-by-case basis.

5.3 External Servers

Several External Servers may be included within or connected to an MMSE, e.g. E-Mail Server, SMS Server (SMSC), Fax. Convergence functionality between External Servers and MMS User Agents is provided by the MMS Relay/Server which enables the integration of different server types across different networks. Several Examples can be found in Annex A.

5.4 MMS User Databases and HLR

The MMS may have access to several User databases. These may consist of e.g. user profile database, subscription database, HLR.

These User Databases shall provide:-

MMS user subscription information;

information for the control of access to the MMS;

information for the control of the extent of available service capability (e.g. server storage space);

a set of rules how to handle incoming messages and their delivery;

information of the current capabilities of the users terminal.

The location of the User Databases and the access to them are outside the scope of this release.

5.5 MMS VAS Applications

The MMS VAS Applications provide value added services to the MMS users. In many ways MMS VAS Applications behave like a fixed MMS User Agent. However, MMS VAS Applications may provide some additional features like MM recall between MMS VAS Applications and MMS Relay/Server which are not available for MMS User Agents.

The present document does not cover what kind of applications might be available and how the MMS VAS Application provide these services.

MMS VAS Applications may be able to generate CDRs when receiving MMs from MMS Relay/Server and when submitting MMs to MMS Relay/Server. The interaction between an MMS Relay/Server and the MMS VAS Application should be provided through the MM7 interface, as described in clause 6.9.

7 MMS Service Behaviour Description

7.1 MMS services offered

7.1.1 Submission of a Multimedia Message in the originator MMSE

When a user intends to send an MM to one or several destinations the MM shall be submitted to the originator MMS Relay/Server.

The support for submission of MMs is optional for MMS User Agents. The support for submission of MMs is mandatory for MMS Relay/Servers.

If an MMS User Agent supports submission of MMs the MMS User Agent shall be able to:

- Indicate the address of the MM recipient
- Identify the MIME content type of the message.

If a MMS User Agent supports submission of MMs the MMS User Agent may be able to:

- Request a delivery report for the message
- Request a read-reply report for the message
- Provide a time stamp for the time of submission of the message
- Set the earliest desired time of delivery for the message
- Set the desired time of expiry for the message
- Indicate the address of the MM originator
- Set further message qualifications (e.g. priority, message class, subject)
- Request the MM originator's address being hidden from the recipient MMS User Agent.
- Request that a copy of the submitted MM be stored in the originator's MMBox, in addition to being delivered to the recipient.

Upon reception of an MM from an originator MMS User Agent the originator MMS Relay/Server

- shall assign a Message Identification to the MM and immediately provide the originator MMS User Agent with this Message Identification
- is responsible for retaining the MM until the earliest desired time of delivery, if the optional feature of earliest time of delivery is supported by the originator MMS Relay/Server. If this feature is not supported then the MM is immediately routed forward.
- may provide a time stamp, i.e. it may also override the MMS User Agent's time stamp,
- shall insert the originator's address into the MM if not yet provided by the originator MMS User Agent
- shall pass the originator's address to the peer entity if the peer entity is known to be a MMS Relay/Server
- shall route forward the request for address hiding unaltered to the recipient MMS Relay/Server if the peer entity is known to be an MMS Relay/Server .
- shall pass the originator's address to the peer entity if the peer entity is not known to be an MMS Relay/Server and address hiding has not been requested by the originator MMS User Agent

- shall not pass the originator's address to the peer entity and should override the address provided by the originator MMS User Agent in the MM to an "anonymous" address if the peer entity is not known to be an MMS Relay/Server and address hiding has been requested by the originator MMS User Agent
- may override the address provided by the originator MMS User Agent in the MM (subject to MMS service provider's preferences)
- is responsible for resolving the MM recipient's address(es),
- if an MMBox is supported and enabled for the originator, shall store a copy of the MM into the originator's MMBox automatically, according to the service configuration for the originator or as requested by the MMS User Agent.
- is responsible to route the MM towards the MM recipients.
- should pass the indication whether or not a delivery report is requested unaltered when routing the MM towards the MM recipient(s)
- shall pass the indication whether or not a read-reply report is requested unaltered when routing the MM towards the MM recipient(s)
- shall pass the indication about MIME content type of the message and message qualifications (e.g. priority, message class, subject) unaltered when routing the MM towards the MM recipient(s)
- shall generate a delivery report indicating "indeterminate" status of the MM's delivery if a delivery report was requested by the originator MMS User Agent and if the peer entity the MM is routed forward to is not known by the originator MMS Relay/Server.

A special case is where the recipient MMS Relay/Server is also the originator MMS Relay/Server. In this case the MM does not have to be routed forward.

7.1.2 Reception of a Multimedia Message in the recipient MMSE

Upon reception of an MM the recipient MMS Relay/Server

- may verify the MM recipient's user profile(s)
- shall store the MM at least until
  - the associated time of expiry is reached,
  - the MM is delivered,
  - the recipient MMS User Agent requests the MM to be routed forward or
  - the MM is rejected.
- may store the MM into an MMBox.

The term "associated time of expiry " refers to either the desired time of expiry set by the originator MMS User Agent or an MMS Relay/Server time of expiry setting.

- shall generate a notification to the recipient MMS User Agent.

Incoming messages from legacy systems may be expected to be converted to MMs.

7.1.2.1 Multimedia Message Notification

With the MM notification the recipient MMS User Agent shall receive a message reference that can be used for retrieving the MM from the recipient MMS Relay/Server. The message reference that is conveyed in a notification shall at least be valid throughout the message expiry period, till the successful retrieval of the MM or until the MM was rejected.

With the MM notification the recipient MMS User Agent may receive additional information on the MM.

If the originator MMS User Agent has requested address hiding the recipient MMS Relay/Server shall not include the originator address into the MM notification.

In a response to the notification the MMS User Agent shall be able to

- reject the MM or
- retrieve the MM, either immediately or at a later time, either manually or automatically, as possibly determined by the operator configuration and user profile.

7.1.3 Retrieval of a Multimedia Message in the recipient MMSE

The recipient MMS User Agent shall be able to request ~~delivery~~retrieval of an MM from the recipient MMS Relay/Server based on the ~~information received in the notification.~~Message Reference received in a notification. If MMBoxes are supported, the MMS User Agent shall be able to request retrieval of an MM from the user's MMBox, based on a Message Reference received from a previous MMBox operation.

Upon ~~delivery~~retrieval request the recipient MMS Relay/Server

- shall deliver the MM to the recipient MMS User Agent
- may perform data adaptation based on user profile and/or MMS User Agent capabilities
- shall not provide the MM originator address to the MM recipient if the originator MMS User Agent requested its address to be hidden from the MM recipient
- shall provide the MM originator address to the MM recipient if the originator MMS User Agent did not request its address to be hidden from the MM recipient and if the MM originator address is available at the recipient MMS Relay/Server
- may provide an alias or clarifying text (e.g. "anonymous address" or "unknown address") in the originator address field instead of providing the originator address to the recipient MMS User Agent, if the originator has requested address hiding or the original message does not contain the originator address
- shall give an indication to the recipient MMS User Agent that a delivery report is requested if such a delivery report has been requested by the originator MMS User Agent
- shall give an indication to the recipient MMS User Agent that a read-reply report is requested if such a read reply report has been requested by the originator MMS User Agent
- shall indicate the MIME content type of the MM to the recipient MMS User Agent
- shall provide other available message qualifications unaltered to the recipient MMS User Agent
- shall provide the time stamp of the MM unaltered to the recipient MMS User Agent
- shall be responsible for the storage of messages in the network until the recipient MMS User Agent becomes reachable (e.g. user moves back into coverage, switches MMS User Agent on) or until the MM expires~~.~~
- should provide the recipient MMS User Agent with a list of addresses of forwarding MMS User Agents for the MM if the MM was forwarded and the address information is available to the recipient MMS Relay/Server.

In a response to an MM's delivery the recipient MMS User Agent may be able to

- request a delivery report not to be generated by the MMS Relay/Server.

7.1.4 Forwarding of a Multimedia Message ~~without prior Retrieval~~

This part of the MMS service describes the mechanism by which an MMS User Agent may request the corresponding MMS Relay/Server, that an MM for which the MMS User Agent is the intended recipient (and is notified of the MM) be forwarded to other specified recipient(s) MMS User Agent(s) whose address(es) shall be specified by the forwarding MMS User Agent, without having to first retrieve the MM.

The support for originating a request that a specific MM be forwarded is optional for the MMS User Agent.

The support for forwarding an MM, in response to a request from a MMS User Agent that a specific MM be forwarded is optional for the MMS Relay/Server.

The original MM is forwarded to a new recipient(s) with the forwarding MMS User Agent's address being provided but without additional content, and without affecting the elements of the original MM. Some additional information elements e.g. delivery report, read-reply report, i.e. requests for reports which are to provide feedback on the forwarded MM to the forwarding MMS User Agent, may be supplied.

~~MM Element Forwarding, where particular elements of an MM are requested to be forwarded, is left for standardisation in future releases.~~

If a forwarding MMS User Agent supports requesting MM forwarding the MMS User Agent shall:

- indicate the address of the MM recipient(s).
- provide the message reference provided in the MM Notification.
- not generate a read-reply report to the originator MMS User Agent even if a read-reply report is requested.

If a MMS User Agent supports requesting forwarding of MMs the forwarding MMS User Agent may:

- Indicate the address of the Forwarding MMS User Agent (i.e. it's own address)
- Request that a copy of the forwarded MM be stored in the MMBox
- Provide a time stamp for the time of submission of the request to forward the MM
- Set the desired time of expiry for the forwarded MM
- Set the earliest desired time of delivery for the forwarded MM
- Request a delivery report for the forwarded MM
- Request a read-reply report for the forwarded MM

Upon reception of a request from a forwarding MMS User Agent to forward an MM, the forwarding MMS Relay/Server

- shall assign a Message Identification to the forwarded MM and immediately provide the forwarding MMS User Agent with this Message Identification
- shall provide status information on the MM forward request to the forwarding MMS User Agent.
- is responsible for retaining the forwarded MM until the earliest desired time of delivery, if the optional feature of earliest time of delivery is supported by the MMS Relay/Server of the forwarding MMS User Agent. If this feature is not supported then the MM is immediately routed forward.
- is responsible for copying the MM into the MMBox, if the MMBox is supported, enabled, and if requested. In addition, the stored MM will have new Recipient address, Sender address, and Date and time information elements appended to the stored MM in such a way that the forwarding history of those information elements is accumulated with repeated forwardings, without losing the Recipient and Sender addresses, and Date and time of the original MM.
- may provide a time stamp for the forwarded MM, i.e. it may also override the forwarding MMS User Agent's time stamp,
- shall insert the forwarding MMS User Agent's address into the forwarded MM if not yet provided
- may override the address provided by the forwarding MMS User Agent in the forwarded MM (subject to MMS service provider's preferences)
- is responsible for resolving the recipient's address(es) of the forwarded MM,
- is responsible to route the forwarded MM towards the MM recipients.

- shall pass the indication whether or not a delivery report is requested unaltered when routing the forwarded MM towards the MM recipients.
- shall pass the indication whether or not a read-reply report is requested unaltered when routing the forwarded MM towards the MM recipient(s)
- shall generate a delivery report indicating "indeterminate" status of the MM's delivery if a delivery report was requested by the forwarding MMS User Agent and if the peer entity the MM is routed forward to is not known to the MMS Relay/Server of the forwarding MMS User Agent.
- shall provide the recipient(s) MMS Relay/Server with a count of the number of times that the particular MM was forwarded.
- shall provide the recipient(s) MMS Relay/Server with a list of addresses of forwarding MMS User Agents for the MM.
- shall generate a delivery report to the originator MMS User Agent if a delivery report is requested.

A special case is where the recipient MMS Relay/Server is also the forwarding MMS Relay/Server. In this case the MM does not have to be routed forward.

…

7.1.11 Support for Persistent Network-based Storage

An MMS User Agent and an MMS Relay/Server may support persistent network-based storage functions. The following descriptions apply when MMBoxes are supported.

For MMS Relay/Servers that support MMBoxes, the following additional functions are defined:

- Upon submission, cause the MM to also be stored persistently, if configured or requested
- Upon arrival, cause the incoming MM to be stored persistently, if configured
- Cause the MM referenced in a notification to be stored persistently
- Cause a copy of a forwarded MM to be stored persistently.
- Upload and store an MM into the user's MMBox
- Forward an MM from the MMBox to one or more recipients
- Delete one or more MMs
- View a list of MMs within the MMBox and their associated information attributes
- Update MM state and/or flags
- Retrieve an MM from the user's MMBox

7.1.11.1 MM State and MM Flags

The MMS Relay/Server shall support both MM State and MM Flags. The MMS User Agent may support MM State or MM Flags, or both.

While persistently stored, each MM has an MM State, representing the condition under which the MM is stored. The states are: Draft, Sent, New, Retrieved, and Forwarded. These states are mutually exclusive. The MMS Relay/Server shall set the following specific values for the MM State, unless otherwise specified by the MMS User Agent:

- The Draft state shall be set when an MM is uploaded and stored;
- The Sent state shall be set when an MM is also stored as part of a submission;
- The New state shall be set when an incoming MM is stored as part of being received by the MMS Relay/Server;
- The Retrieved state shall be set upon retrieval of an MM;
- The Forwarded state shall be set whenever an MM is forwarded.

In addition to state, MMs may be flagged with keyword values, which shall be set by the MMS User Agent. The flags may be used to perform selections on the MMBox, offering more precise control over which MMs are to be returned on a view request.

7.1.11.2 Requests to Store MMs within an MMBox

The MMS Relay/Server shall store an MM into an MMBox under the following conditions:

- Arrival of an MM, prior to notification, if configured and enabled for the recipient's MMBox;
- Store request by an MMS User Agent, based on a Message Reference received in a notification;
- MMS User Agent submitting an MM, which also includes a store request;
- MMS User Agent forwarding an MM, which also includes a store request
- MMS User Agent uploading an MM for storage into the MMBox

The MMS Relay/Server shall provide the Message Reference from the newly stored MM to the MMS User Agent.

7.1.11.3 Requests to Retrieve MMBox Content

The MMS Relay/Server shall support the following operations on the MMs within an MMBox, or on the MMBox itself:

- Retrieve an MM
- Forward an MM
- Store (update) state and flags on an MM
- View information elements within selected MMs

The Store and View operations shall return a Message Reference to selected MMs, in addition to their other functions.

7.1.11.4 MM Deletions

MMs stored within an MMBox shall be retained until:

- Automatic deletion occurs because the time of expiry was exceeded;
- The MMS User Agent issues a request to delete an MM based on a Message Reference obtained from an MMBox operation.

7.1.11.5 MMBox Service Constraints

MMS Relay/Servers supporting MMBoxes should not store the same MM twice within an MMBox.

> Note: if the operator has configured automatic MMBox storage for incoming MMs, and the MMS User Agent issues a request to store an MM within the MMBox for a newly arrived MM, the MMS Relay/Server should store the newly arrived MM only once.

MMS Relay/Servers that support MMBoxes shall not generate multiple delivery reports of the same status for MMs stored within the MMBox.

MMS User Agents that support MMBoxes shall not generate multiple read-reply reports for MMs stored within an MMBox.

8 MMS Application Protocol Framework and Technical Realisation of MMS Service Features

This clause defines the application protocol framework and describes the technical realisation of MMS service features in terms of abstract messages. The abstract messages can be categorised into *transactions* consisting of *requests* and *responses*. The labelling of the MMS abstract messages follows these conventions:

- the transactions between the MMS UA and MMS Relay/Server are prefixed with "MM1";
- the transactions between the MMS Relay/Servers are prefixed with "MM4";
- requests are identified with ".REQ" as a suffix;
- responses are identified with the"".RES" suffix.

Each abstract message carries with it certain information elements, which may vary according to the specific message. All messages shall carry, as information elements, a protocol version and message type, in order that the MMSE components may be able to properly identify and manage the message contents.

Specific information regarding the message encapsulation, including order, possible values, and encoding are beyond the scope of this clause. These details will be defined within each MMSE protocol environment.

The mapping of abstract messages to specific protocols is not necessarily a one-to-one relationship. Depending on the MMS Implementation (WAP etc.), one or more abstract messages may be mapped to a single lower layer PDU, and a single abstract message may be mapped to multiple lower layer PDUs, if the information carried in the PDU(s) serve the purpose of required information in the subjected abstract message(s).

In MM1 responses that provide a status information, the status information returned has no correspondence to the Status information returned in MM4 responses; they are independent of each other.

The MM1 response status, which are limited by design to as small a set of values as possible, may correlate to status and errors occurring within the communications protocols underlying the implementation of the MM4 abstract messages. Similarly, the MM4 status may correlate to those occurring within the communications protocols underlying the implementation of the MM1 abstract messages. The definition of these correlations is out of scope of the present document, and should be provided by the MMS implementations.

The MMS application protocol shall provide means to uniquely identify the version number and message type in each abstract message defined here. The order, possible values and encoding of the information elements for each abstract message are beyond the scope of this clause, and shall be dictated by the protocol environment.

The following figure shows an example abstract message flow when a multimedia message is sent from an originator MMS User Agent to a recipient MMS User Agent. The scope of this figure is limited to abstract messages on reference points MM1 and MM4 only.

Delivery reports are sent by the recipient MMS Relay/Server. Read-reply reports are sent by the recipient MMS User Agent.

Below are Figures 6 and 7. Figure 6 shows a typical transaction for an MMS User Agent submitting an MM addressed to an MMS User Agent serviced by another MMS Relay/Server. Figure 7 shows the abstract messages that may involve the MMBox. These figures are only examples, and do not show all possible transactions between a MMS User Agent and the MMS Relay/Server.

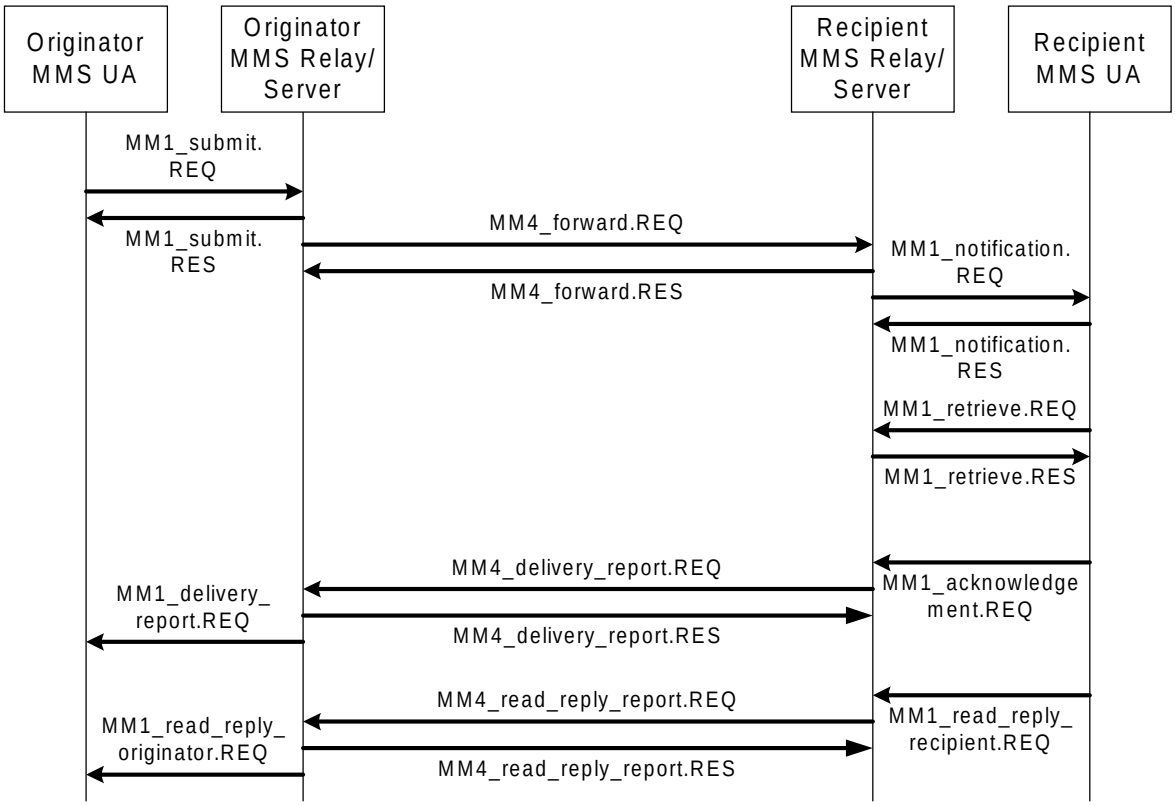

Figure 6: Example Abstract Message Flow

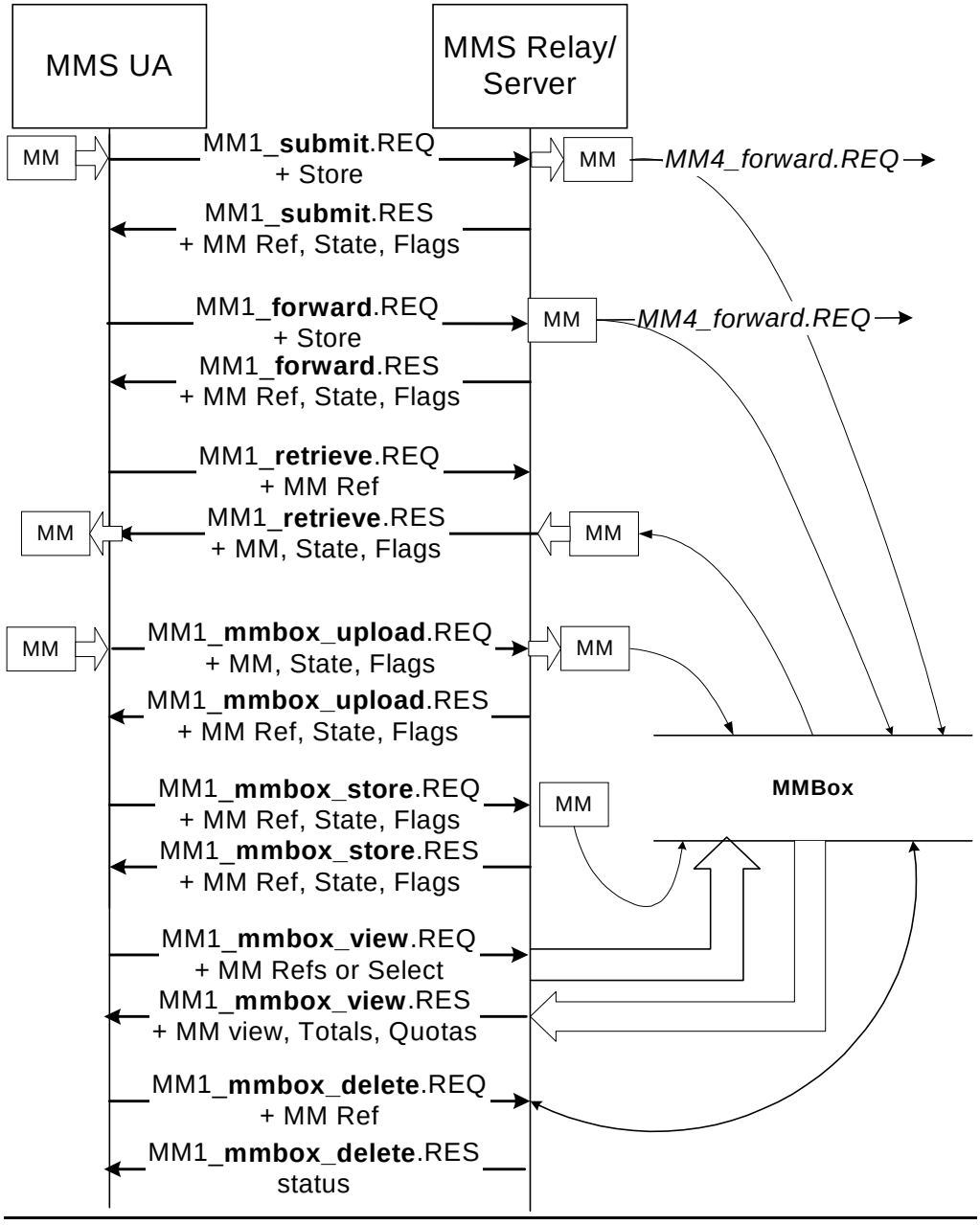

Figure 7: Example Abstract Message Flows with Persistent Storage

8.1 Technical realisation of MMS on reference point MM1

Reference point MM1 defines the transactions between the MMS User Agent and the MMS Relay/Server. These transactions include notifications of new MMs, retrieval of MMs, forwarding of MMs, and delivery and read-reply reporting. Figure 6 illustrates some of these transactions and their relationships, in an end-to-end manner.

Additional transactions are specified for MMBox implementations that allow MMs and information about them to be stored, retrieved, changed, and deleted.

8.1.x Authentication Mechanisms for MM1

On the MM1 reference point an underlying authentication mechanism should be available.

The network-provided MMS User Agent's ID (e.g. MSISDN or IMSI) should be made available to the MMS Relay/Server by the RADIUS mechanisms defined in [54]. This ID should be used to authenticate the MMS User Agent.

8.1.1 Submission of Multimedia Message

This part of MMS service covers the submission of an MM. For sending purposes a terminal-originated MM shall always be submitted from the originator MMS User Agent to the corresponding MMS Relay/Server. Involved abstract messages are outlined in Table 1 from type and direction points of view.

Table 1: Abstract messages for submission of MM in MMS

Abstract messages	Type	Direction
MM1_submit.REQ	Request	MMS UA -> MMS Relay/Server
MM1_submit.RES	Response	MMS Relay/Server -> MMS UA

8.1.1.1 Normal operation

The originator MMS User Agent shall submit a terminal-originated MM to the originator MMS Relay/Server using the MM1_submit.REQ, which contains MMS control information and the MM content. If the Store information element is present, the MM will also be copied to the MMBox, if the MMBox is supported and enabled for the subscriber.

The MMS Relay/Server shall respond with an MM1_submit.RES, which provides the status of the request. The MM1_submit.RES shall unambiguously refer to the corresponding MM1_submit.REQ.

Support for MM1_submit.REQ is optional for the MMS UA, support for MM1_submit.RES is mandatory for the MMS Relay/Server.

8.1.1.2 Abnormal Operation

In this case the originator MMS Relay/Server shall respond with a MM1_submit.RES encapsulating a status which indicates the reason the multimedia message was not accepted, e.g. no subscription, corrupt message structure, service not available, MMBox not supported, MMBox not enabled, MMBox over quota, MMBox system full, MMBox I/O error.

If the MMS Relay/Server does not provide the MM1_submit.RES the MMS User Agent should be able to recover.

8.1.1.3 Features

Addressing: One or several MM recipients of a submitted MM shall be indicated in the addressing-relevant information field(s) of the MM1_submit.REQ. The originator of a submitted MM may be indicated in addressing-relevant information field(s) of the MM1_submit.REQ. The originator MMS User Agent may request to hide its identity from the MM recipient.

Time stamping: The originator MMS User Agent may time stamp the MM.

Time constraints: The originator MMS User Agent may also request an earliest desired time of delivery of the MM. The originator MMS User Agent may request a time of expiry for the MM. In case of reply-charging the originator MMS User Agent may also request a deadline for the latest time of submission of reply-MMs granted to the recipient(s).

Reply-Charging: The originator MMS User Agent may indicate that the sender wants to pay for a reply-MM and convey the reply-charging limitations (e.g. the latest time of submission and/or the maximum size of a reply-MM) in the MM1_submit.REQ.

Message class, priority and subject: The MM may be qualified further by adding a message class, priority and/or subject to the MM in the MM1_submit.REQ. Additional qualifiers may be added.

Reporting: The originator MMS User Agent may request a delivery report for the MM. In addition, the originator MMS User Agent may request a read-reply report when the user has viewed the MM.

Identification: The originator MMS Relay/Server shall always provide a message identification for an MM, which it has accepted for submission in the MM1_submit.RES. In case of reply-charging the MMS User Agent which submits a reply-MM (i.e. the MMS User Agent that received the original MM) shall provide the message-ID of the original MM which it replies to in the MM1_submit.REQ.

Persistent storage: In addition to being submitted for normal delivery, the MMS User Agent may request that the submitted MM be stored into the MMBox, by the presence of the Store information element. As part of the store request, the MM State and MM Flags can be set with the use of corresponding information elements. The response to a Store request shall include a Message Reference to the newly stored MM, as well as the associated MM State and optional MM Flags.

Content Type: The MIME type of the multimedia content shall always be identified in the MM1_submit.REQ.

Content: The originator MMS User Agent may add content in the MM1_submit.REQ.

Request Status: The originator MMS Relay/Server shall indicate the status of the MM1_submit.REQ in the associated MM1_submit.RES. The reason code given in the status information element of the MM1_submit.RES may be supported with an explanatory text further qualifying the status. If this text is available in the status text information element the MMS User Agent should bring it to the user's attention. The choice of the language used in the status text information element is at the discretion of the MMS service provider.

8.1.1.4 Information Elements

Table 2: Information elements in the MM1_submit.REQ.

Information element	Presence	Description
Recipient address	Mandatory	The address of the recipient MMS User Agent. Multiple addresses are possible.
Content type	Mandatory	The content type of the MM's content.
Sender address	Optional	The address of the MM originator.
Message class	Optional	The class of the MM (e.g., personal, advertisement, information service)
Date and time	Optional	The time and date of the submission of the MM (time stamp).
Time of Expiry	Optional	The desired time of expiry for the MM or reply-MM.
Earliest delivery time	Optional	The earliest desired time of delivery of the MM to the recipient.
Delivery report	Optional	A request for delivery report.
Reply-Charging	Optional	A request for reply-charging.
Reply-Deadline	Optional	In case of reply-charging the latest time of submission of replies granted to the recipient(s).
Reply-Charging-Size	Optional	In case of reply-charging the maximum size for reply-MM(s) granted to the recipient(s).
Priority	Optional	The priority (importance) of the message.
Sender visibility	Optional	A request to show or hide the sender's identity when the message is delivered to the recipient.
Store	Optional	A request to store a copy of the MM into the user's MMBox, in addition to the normal delivery of the MM.
MM State	Optional	The value to set in the MM State information element of the stored MM, if Store is present.
MM Flags	Optional	one or more MM Flag keywords to set in the MM Flags information element of the stored MM, if Store is present
Read reply	Optional	A request for read reply report.
Subject	Optional	The title of the whole multimedia message.
Reply-Charging-ID	Optional	In case of reply-charging when the reply-MM is submitted within the MM1_submit.REQ this is the identification of the original MM that is replied to.
Content	Optional	The content of the multimedia message

Table 3: Information elements in the MM1_submit.RES.

Information element	Presence	Description
Request Status	Mandatory	The status of the MM submit request.
Request Status Text	Optional	Description which qualifies the status of the MM submit request.
Message ID	Conditional	The identification of the MM if it is accepted by the originator MMS Relay/Server.
Store Status	Conditional	If the Store request was present in MM1_submit.REQ, the status of the store request.
Store Status Text	Optional	The explanatory text corresponding to the Store Status, if present.
Stored Message Reference	Conditional	If the Store request was present in MM1_submit.REQ, the message reference to the newly stored MM.

8.1.2 Multimedia Message Notification

This part of the MMS service covers the notification about MM from the recipient MMS Relay/Server to the corresponding recipient MMS User Agent and involving abstract messages are outlined in Table 4 from type, and direction points of view.

Table 4: abstract messages for notification of MM in MMS

Abstract message	Type	Direction
MM1_notification.REQ	Request	MMS Relay/Server -> MMS UA
MM1_notification.RES	Response	MMS UA -> MMS Relay/Server

8.1.2.1 Normal Operation

Upon receiving the MM1_notification.REQ, the recipient MMS User Agent shall respond with the MM1_notification.RES to the recipient MMS Relay/Server to acknowledge the successful reception of the MM1_notification.REQ.

The MM1_notification.RES shall unambiguously refer to the corresponding MM1_notification.REQ.

8.1.2.2 Abnormal Operation

In this case the MMS UA shall respond with a MM1_notification.RES encapsulating a status which indicates the reason the notification could not be processed. If the MMS UA does not provide the MM1_notification.RES the MMS Relay/Server should be able to retransmit the notification at a later state.

8.1.2.3 Features

Addressing: The MM originator address may be provided to recipient MMS User Agent in the MM1_notification.REQ.

Time constraints: The recipient MMS User Agent shall be provided a time of expiry of the MM. In case of reply-charging the deadline for the latest time of submission of a reply-MM should be conveyed within the MM1_notification.REQ.

Reply-Charging: In case of reply-charging the MMS Relay/Server may indicate in the MM1_notification.REQ that a reply to the notified original MM is free of charge and the reply-charging limitations.

Message class, message size, priority and subject: The MM shall be qualified further by adding a message class and an approximate size to the MM in the MM1_notification.REQ. The MM may be qualified further by adding a priority and/or subject to the MM. Additional qualifiers may be added.

Reporting: If the originator MMS User Agent has requested to have a delivery report, the recipient MMS Relay/Server may convey this information to the recipient MMS User Agent in the MM1_notification.REQ. The recipient MMS User Agent may indicate in the MM1_notification.RES that it would not wish a delivery report to be created.

Identification: In case of reply-charging when a reply-MM is notified within the MM1_notification.REQ the MMS Relay/Server should convey the identification of the original MM replied to within the same MM1_notification.REQ.

Persistent storage: When the MMBox is configured such that incoming MMs are stored automatically, the MM1_notification.REQ shall contain the Stored information element.

Message Reference: The recipient MMS Relay/Server shall always provide a reference, e.g., URI, for the MM in the MM1_notification.REQ. When incoming MMs are stored automatically, the Message Reference will refer to the newly stored MM within the MMBox.

MM Status: The recipient MMS User Agent may indicate in the MM1_notification.RES how it intends the MM to be handled, e.g. the immediate rejection of the MM.

MM element descriptor: The recipient MMS Relay/Server may provide one or more description(s) of message elements in the MM1_notification.REQ. A description shall contain a reference to the message element, e.g. a URI, an index number etc.. A description of a message element may be further qualified by adding one or more of such parameters as:

- name of the message element
- type and format of the message element
- approximate size of the message element

8.1.2.4 Information Elements

Table 5: Information elements in the MM1_notification.REQ.

Information element	Presence	Description
Message class	Mandatory	The class of the MM (e.g., personal, advertisement, information service; default = personal)
Message size	Mandatory	The approximate size of the MM
Time of expiry	Mandatory	The time of expiry for the MM.
Message Reference	Mandatory	a reference, e.g., URI, for the MM
Subject	Optional	The title of the whole MM.
Priority	Optional	The priority (importance) of the message.
Sender address	Optional	The address of the MM originator.
Stored	Optional	Indicates that the MM was automatically stored into the MMBox.
Delivery report	Optional	Request for delivery report
Reply-Charging	Optional	Information that a reply to this particular original MM is free of charge.
Reply-Deadline	Optional	In case of reply-charging the latest time of submission of a reply granted to the recipient.
Reply-Charging-Size	Optional	In case of reply-charging the maximum size of a reply-MM granted to the recipient.
Reply-Charging-ID	Optional	The identification of the original MM replied to if this notification indicates a reply-MM.
Element-Descriptor	Optional	The reference for an element of the MM, which may contain further information about the referenced element of the MM, e.g. the name, the size and/or the type and format of the message element

Table 6: Information elements in the MM1_notification.RES.

Information element	Presence	Description
MM Status	Optional	The status of the MM's retrieval
Report allowed	Optional	Request to allow or disallow the sending of a delivery report to the MM originator

8.1.3 Retrieval of Multimedia Message

This part of MMS service covers the retrieval of an MM. For retrieval purposes an MM shall always be retrieved by the recipient MMS User Agent from the recipient MMS Relay/Server. Involved abstract messages are outlined in Table 7 from type and direction points of view.

Table 7: Abstract messages for retrieval of MM in MMS

Abstract messages	Type	Direction
MM1_retrieve.REQ	Request	MMS UA -> MMS Relay/Server
MM1_retrieve.RES	Response	MMS Relay/Server -> MMS UA
MM1_acknowledgement.REQ	Request	MMS UA -> MMS Relay/Server

8.1.3.1 Normal Operation

The recipient MMS User Agent shall issue an MM1_retrieve.REQ to the recipient MMS Relay/Server to initiate the retrieval process. The MMS Relay/Server shall respond with an MM1_retrieve.RES, which contains MMs control information and the MM content.

After receiving the MM1_retrieve.RES, the recipient MMS User Agent shall send an MM1_acknowledgement.REQ to the corresponding MMS Relay/Server, if requested by the MMS Relay/Server. The MM1_acknowledgement.REQ shall unambiguously refer to the corresponding MM1_retrieve.RES.

8.1.3.2 Abnormal Operation

If the recipient MMS Relay/Server can not process the MM1_retrieve.REQ, for example due to invalid content location or expiration of the message, the recipient MMS Relay/Server shall respond with either an MM1_retrieve.RES or a lower protocol layer error message encapsulating a status which indicates the reason to the MMS User Agent the multimedia message was not delivered.

If the MMS Relay/Server does not provide the MM1_retrieve.RES or the lower protocol layer error message the MMS User Agent should be able to recover.

8.1.3.3 Features

Message Reference: The recipient MMS User Agent shall provide a reference, e.g., URI, for the MM in the MM1_retrieve.REQ.

This reference was previously delivered to the MMS User Agent from MM1_notification.REQ, MM1_submit.RES, MM1_forward.RES, MM1_mmbox_view.RES, MM1_mmbox_upload.RES, or MM1_mmbox_store.RES. In the latter cases, the Message Reference will address an MM that resides in the MMBox.

Addressing: The MM originator address may be provided to the recipient MMS User Agent in the addressing-relevant information field of MM1_retrieve.RES. The MM originator address shall not be provided to the recipient MMS User Agent if the MM originator has requested her address to be hidden from the MM recipient. One or several address(es) of the MM recipient(s) may be provided to the recipient MMS User Agent in the addressing-relevant information field(s) of the MM1_retrieve.RES.

Time stamping: The MM1_retrieve.RES shall carry the time and date of submission of the MM or the time and date of the forwarding of the MM.

Time constraints: In case of reply-charging the deadline for the latest time of submission of a reply-MM shall be conveyed within the MM1_retrieve.RES.

Message class, priority and subject: Information about class, priority, subject of the MM shall be included in the MM1_retrieve.RES according to their presence and value received at the MMS Relay/Server. Information about additional end-to-end qualifiers of the MM should be included in the MM1_retrieve.RES according to their presence and value received at the MMS Relay/Server.

Reporting: If the originator MMS User Agent has requested to have a read-reply report, the recipient MMS Relay/Server shall convey this information in the MM1_retrieve.RES. If the originator MMS User Agent has requested to have a delivery report, the recipient MMS Relay/Server may convey this information to the recipient MMS User Agent in the MM1_retrieve.RES.

If a request for a delivery report is included in the MM1_retrieve.RES the recipient MMS User Agent shall convey the information whether it accepts or denies the sending of a delivery report to the MM originator in MM1_acknowledgement.REQ.

If a delivery report is not requested, it is up to the recipient MMS User Agent to include this information in MM1_acknowledgement.REQ or not.

Reply-Charging: In case of reply-charging the MMS Relay/Server should indicate in the MM1_retrieve.RES that a reply to this particular original MM is free of charge and the reply-charging limitations.

Identification: The MMS Relay/Server shall provide a message identification for a message, which it has accepted for delivery in the MM1_retrieve.RES. In case of reply-charging the MMS Relay/Server shall provide the message-ID of the original MM which is replied to in the MM1_retrieve.RES.

Persistent storage: In the MM1_retrieve.RES, the MMS Relay/Server shall convey the MM State and/or MM Flags information elements if they have been previously set for the persistently stored MM.

Content Type: The type of the MM's content shall always be identified in the MM1_retrieve.RES.

Content: The content of the multimedia message if added by the originator MMS User Agent of the MM may be conveyed in the MM1_retrieve.RES.

Status: In case of normal operation the recipient MMS Relay/Server may indicate in the MM1_retrieve.RES that the retrieval of the MM was processed correctly. In case of abnormal operation the recipient MMS Relay/Server shall indicate in the MM1_retrieve.RES the reason why the multimedia message could not be retrieved. The corresponding reason codes should cover application level errors (e.g. "the media format could not be converted", "insufficient credit for retrieval"). Lower layer errors may be handled by corresponding protocols.

Status Text: The status text is optional, and may be returned to provide explanatory text corresponding to the Status code.

Forwarded_by: The address of the forwarding MMS User Agent. Multiple addresses are possible. In the multiple address case this is a sequential list of the address(es) of the forwarding MMS User Agents who forwarded the same MM.

8.1.3.4 Information Elements

Table 8: Information elements in the MM1_retrieve.REQ

Information element	Presence	Description
Message Reference	Mandatory	Location of the content of the MM to be retrieved.

Table 9: Information elements in the MM1_retrieve.RES

Information element	Presence	Description
Message ID	Mandatory	The message ID of the MM.
Sender address	Conditional	The address of the originator of MM unless the originator MMS User Agent has requested her address to be hidden from the MM recipient.
Content type	Mandatory	The content type of the MM's content.
Recipient address	Optional	The address of the MM recipient. Multiple addresses are possible.
Message class	Optional	The class of the message (e.g., personal, advertisement, information service)
Date and time	Mandatory	The time and date of the submission of the MM or the time and date of the forwarding of the MM (time stamp)
Delivery report	Optional	A request for delivery report.
Priority	Conditional	The priority (importance) of the message if specified by the originator MMS User Agent..
Read reply	Conditional	A request for read-reply report if the originator MMS User Agent of the MM has requested a read-reply report.
Subject	Conditional	The title of the whole multimedia message if specified by the originator MMS User Agent of the MM.
MM State	Conditional	The MM State. May be absent for incoming MMs; shall be present for persistently stored MMs
MM Flags	Optional	Present only for persistently stored MMs. One or more keyword flags, which shall be present if they have been previously set for the MM.
Status	Optional	The status of the MM retrieve request.
Status Text	Optional	Description which qualifies the status of the MM retrieve request.
Reply-Charging	Optional	Information that a reply to this particular original MM is free of charge.
Reply-Charging-ID	Optional	In case of reply-charging this is the identification of the original MM replied to.
Reply-Deadline	Optional	In case of reply-charging the latest time of submission of a reply granted to the recipient.
Reply-Charging-Size	Optional	In case of reply-charging the maximum size of a reply-MM granted to the recipient.
Forwarded_by	Conditional	The address of the forwarding MMS User Agent. Multiple addresses are possible. In the multiple address case this is a Sequential list of the address(es) of the forwarding MMS User Agents who forwarded the same MM.
Content	Conditional	The content of the multimedia message if specified by the originator MMS User Agent of the MM.

Table 10: Information elements in the MM1_acknowledgement.REQ

Information element	Presence	Description
Report allowed	Optional	Request to allow or disallow the sending of a delivery report to the MM originator

8.1.4 Forwarding of Multimedia Message

This part of the MMS service describes the mechanism by which a forwarding MMS User Agent can request from the corresponding MMS Relay/Server, that an MM for which the MMS User Agent is the intended recipient (and has been notified of the MM) be forwarded to other specified recipient(s) MMS User Agent(s) whose address(es) shall be specified by the forwarding MMS User Agent, without having to first retrieve the MM. If the MMBox is supported, the MM being forwarded may also be requested to be stored in to the originator's MMBox.

For forwarding purposes an MM forward request shall always be requested by the forwarding MMS User Agent of the forwarding MMS Relay/Server. Involved abstract messages are outlined in Table 11 from type and direction points of view.

Table 11: Abstract messages for forwarding of MM ~~without prior retrieval~~

Abstract messages	Type	Direction
MM1_forward.REQ	Request	MMS UA -> MMS Relay/Server
MM1_forward.RES	Response	MMS Relay/Server -> MMS UA

8.1.4.1 Normal operation

The forwarding MMS User Agent shall issue an MM1_forward.REQ to the forwarding MMS Relay/Server, which contains MMS control information. The MMS Relay/Server shall respond with an MM1_forward.RES, which provides the status of the request.

The MM1_forward.RES shall unambiguously refer to the corresponding MM1_forward.REQ.

Support for MM1_forward.REQ ~~is optional for the MMS User Agent. Support for~~and MM1_forward.RES is mandatory for the MMS Relay/Server that also supports MMBoxes. Otherwise, support for MM1_forward.REQ is optional for the MMS ~~Relay/Server.~~User Agent, and support for MM1_forward.REQ is optional for the MMS Relay/Server.

8.1.4.2 Abnormal Operation

In this case the MMS Relay/Server shall respond with an MM1_forward.RES encapsulating a status which indicates the reason the request for forwarding was not accepted, e.g. no subscription, service not available, invalid content location, message expired, MMBoxes not supported, MMBox not enabled, MMBox over quota, MMBox system full, MMBox I/O error.

When MM1_forward.REQ contains a Store request, the MMS Relay/Server shall provide the results of the store operation in the MM1_forward.RES. If the MMS Relay/Server does not provide the MM1_forward.RES the MMS User Agent should be able to recover.

8.1.4.3 Features

Addressing: One or several recipients of an MM forward request shall be indicated in the addressing-relevant information field(s) of the MM1_forward.REQ. The forwarding MMS User Agent may be indicated in addressing-relevant information field(s) of the MM1_forward.REQ.

Time stamping: The forwarding MMS User Agent may time stamp the MM.

Time constraints: The forwarding MMS User Agent may request an earliest desired time of delivery of the MM. The forwarding MMS User Agent may request a time of expiry for the MM.

Reporting: The forwarding MMS User Agent may request a delivery report for the MM. In addition, the forwarding MMS User Agent may request a read-reply report when the user has viewed the MM.

Identification: The MMS Relay/Server of the forwarding MMS User Agent shall always provide a message identification for an MM forward request, which it has accepted for being forwarded in the MM1_forward.RES.

Persistent storage: If MMBoxes are supported, the presence of the Store information element in MM1_forward.REQ is a request to have a copy of the message being forwarded stored persistently within the forwarder's MMBox. The MM State and/or MM Flags values of the stored MM may be set with the values from the corresponding information elements.

Message Reference: The forwarding MMS User Agent shall always provide the reference, e.g., URI, for the MM in the MM1_forward.REQ which was provided in MM1_notification.REQ.

Status: The MMS Relay/Server of the forwarding MMS User Agent shall indicate the status of the MM1_forward.REQ in the MM1_forward.RES. The reason code given in the status information element of the MM1_forward.RES may be supported with an explanatory text further qualifying the status. If this text is available in the status text information element the MMS User Agent should bring it to the user's attention. The choice of the language used in the status text information element is at the discretion of the MMS service provider.

8.1.4.4 Information Elements

Table 12: Information elements in the MM1_forward.REQ.

Information element	Presence	Description
Recipient address	Mandatory	The address of the recipient of the forwarded MM. Multiple addresses are possible.
Forwarding address	Optional	The address of the forwarding MMS User Agent.
Date and time	Optional	The time and date of the forwarding of the MM.
Time of Expiry	Optional	The desired time of expiry for the forwarded MM.
Earliest delivery time	Optional	The earliest desired time of delivery of the MM to the recipient.
Store	Optional	If MMBoxes are supported, the presence of the Store information element in MM1_forward.REQ causes a copy of the MM being forwarded to be stored in the user's MMBox, unless the Message Reference is to an MM already in the MMBox.
MM State	Optional	The value to set in the MM State information element of the stored MM, if Store is present.
MM Flags	Optional	One or more MM Flag keywords to set in the MM Flags information element of the stored MM, if Store is present
Delivery report	Optional	A request for delivery report for the forwarded MM.
Read reply	Optional	A request for read reply report.
Message Reference	Mandatory	A reference, e.g., URI, for the MM being forwarded. This may either be the Message Reference from MM1_notification.REQ, MM1_mmbox_store.REQ, or MM1_mmbox_view.REQ.

Table 13: Information elements in the MM1_forward.RES.

Information element	Presence	Description
Status	Mandatory	The status of the MM Forward request.
Status Text	Optional	Description which qualifies the status of the MM Forward request.
Message ID	Mandatory	The unique identification of the forwarded MM ~~given to an accepted MM~~.
Store status	Conditional	The status of the store request, if the Store request was present in MM1_forward.REQ.
Store Status Text	Optional	The explanatory text corresponding to the Store status, if present.
Stored Message Reference	Conditional	The message reference to the newly stored copy of the forwarded MM, if the Store request was present in MM1_forward.REQ and the store operation was successful.

8.1.5 Delivery Report

This part of MMS service covers the sending of delivery report from originator MMS Relay/Server to the originator MMS User Agent. The involved abstract message is outlined in Table 14 from type and direction points of view.

Table 14: abstract message for sending delivery reports in MMS

Abstract Message	Type	Direction
MM1_delivery_report.REQ	Request	MMS Relay/Server -> MMS UA

8.1.5.1 Normal Operation

The originator MMS Relay/Server shall (subject to user, MMS service provider and/or operator preferences) create the MM1_delivery_report.REQ and send it to the originator MMS User Agent when the appropriate information for the creation of a delivery report is available. Support for MM1_delivery_report.REQ is optional for the MMS User Agent but mandatory for the MMS Relay/Server.

8.1.5.2 Abnormal Operation

The MMS protocol framework does not provide mechanisms to cover and handle the unsuccessful delivery of MM1_delivery_report.REQ. The underlying protocols shall provide reliable transport of MM1_delivery_report.REQ.

8.1.5.3 Features

Identification: In the MM1_delivery_report.REQ the MMS Relay/Server shall always provide the original message identification of the MM that the delivery report corresponds to.

Addressing: The MM recipient address shall be provided to the originator MMS User Agent in the addressing-relevant information field of MM1_delivery_report.REQ.

Time stamping: The MM1_delivery_report.REQ shall carry the time and date of handling of the MM (e.g. retrieval, expiry, rejection)**.**

MM Status: The MM1_delivery_report.REQ shall carry the status of the MM delivery, e.g. retrieved, forwarded, rejected, expired or indeterminate.

8.1.5.4 Information Elements

Table 15: Information elements in the MM1_delivery_report.REQ.

Information element	Presence	Description
Message ID	Mandatory	The identification of the original MM.
Recipient address	Mandatory	The address of the MM recipient of the original MM.
Event Date	Mandatory	Date and time the MM was handled (retrieved, expired, rejected, etc.) (time stamp)
MM Status	Mandatory	Status of the MM, e.g. retrieved, forwarded, expired, rejected

8.1.6 Read-Reply Report

This part of MMS service covers the sending of read-reply report from the recipient MMS User Agent to the recipient MMS Relay/Server and the sending of read-reply report from the originator MMS Relay/Server to the originator MMS User Agent. The involved abstract messages are outlined in Table 16 from type and direction points of view.

Table 16: Abstract messages for sending and receiving read-reply report in MMS

Abstract messages	Type	Direction
MM1_read_reply_recipient.REQ	Request	MMS UA -> MMS Relay/Server
MM1_read_reply_originator.REQ	Request	MMS Relay/Server -> MMS UA

8.1.6.1 Normal Operation

If a read-reply report is requested for an MM, the recipient MMS User Agent may create the MM1_read_reply_recipient.REQ and send it to the recipient MMS Relay/Server.

The originator MMS Relay/Server shall (subject to user, MMS service provider and/or operator preferences) create the MM1_read_reply_originator.REQ and send it to the originator MMS User Agent when the appropriate information for the creation of a read-reply report is available.

Support for MM1_read_reply_recipient.REQ and MM1_read_reply_originator.REQ is optional for the MMS User Agent but mandatory for the MMS Relay/Server.

8.1.6.2 Abnormal Operation

The MMS protocol framework does not provide mechanisms to cover and handle the unsuccessful delivery of MM1_read_reply_recipient.REQ and MM1_read_reply_originator.REQ.

8.1.6.3 Features

Identification: In the MM1_read_reply_recipient.REQ the recipient MMS User Agent shall provide the original message identification of the MM that the read-reply report corresponds to. In the MM1_read_reply_originator.REQ the originator MMS Relay/Server shall provide the original message identification of the MM that the read-reply report corresponds to.

Addressing: The MM originator address shall be provided in the addressing-relevant information field(s) of MM1_read_reply_recipient.REQ. The MM recipient address shall be provided in the addressing-relevant information field(s) of MM1_read_reply_recipient.REQ. Both, the MM recipient and MM originator addresses shall be provided in the addressing-relevant information field(s) of the MM1_read_reply_originator.REQ. If the MM recipient address is not yet provided in the MM1_read_reply_recipient.REQ the MM1_read_reply_originator.REQ shall carry the MM recipient address set by the recipient MMS Relay/Server.

Time stamping: The MM1_read_reply_recipient.REQ may carry the time and date of user handling the MM depending on the status of the MM. The MM1_read_reply_originator.REQ shall carry the time-stamp from the corresponding MM1_read_reply_recipient.REQ if provided. If this time-stamp is not yet provided the MM1_read_reply_originator.REQ shall carry the time-stamp set by the recipient MMS Relay/Server.

MM Status: Both the MM1_read_reply_recipient.REQ and MM1_read_reply_originator.REQ shall carry the status of the MM retrieval, e.g. read or without being read.

8.1.6.4 Information Elements

Table 17: Information elements in the MM1_read_reply_recipient.REQ.

Information element	Presence	Description
Recipient address	Mandatory	The address of the MM recipient of the original MM, i,e, the originator of the read-reply report.
Originator address	Mandatory	The address of the MM originator of the original MM, i,e, the recipient of the read-reply report.
Message-ID	Mandatory	The message ID of the original MM.
Date and Time	Optional	Date and time the MM was handled (read, deleted without being read, etc.) (time stamp)
Read Status	Mandatory	Status of the MM, e.g. Read, Deleted without being read

Table 18: Information elements in the MM1_read_reply_originator.REQ.

Information element	Presence	Description
Recipient address	Mandatory	The address of the MM recipient of the original MM, i,e, the originator of the read-reply report.
Originator address	Mandatory	The address of the MM originator of the original MM, i,e, the recipient of the read-reply report.
Message-ID	Mandatory	The message ID of the original MM.
Date and Time	Mandatory	Date and time the MM was handled (read, deleted without being read, etc.) (time stamp)
Read Status	Mandatory	Status of the MM, e.g. Read, Deleted without being read

8.1.7 Storing and Updating Multimedia Messages in an MMBox

This section describes the storage of an MM into the user's MMBox. Requests from an MMS User Agent to store MMs will always be sent to the corresponding MMS Relay/Server. Involved abstract messages are outlined in the table below from type and direction points of view.

Table 22: Abstract messages for storing or updating stored MMs

Abstract messages	Type	Direction
MM1_mmbox_store.REQ	Request	MMS UA -> MMS Relay/Server
MM1_mmbox_store.RES	Response	MMS UA <- MMS Relay/Server

8.1.7.1 Normal operation

The MMS User Agent shall submit a request to store an MM into the MMBox using the MM1_mmbox_store.REQ, which contains the Message Reference received in the MM1_notification.REQ. In addition, the MMS User Agent shall submit a request to update the MM State and/or MM Flags of an MM already stored within an MMBox using the MM1_mmbox_store.REQ, which contains the Message Reference, MM State and/or MM Flags obtained from any previous operation resulting in an MM being stored or updated in the MMBox.

The MMS Relay/Server shall respond with an MM1_mmbox_store.RES, which provides the status of the store or MM update request. The MM1_mmbox_store.RES shall unambiguously refer to the corresponding MM1_mmbox_store.REQ.

Support for MM1_mmbox_store transactions are optional for the MMS UA and mandatory for the MMS Relay/Server, if MMBoxes are supported.

8.1.7.2 Abnormal Operation

In this case the MMS Relay/Server shall respond with a MM1_mmbox_store.RES containing a status which indicates the reason the multimedia message was not able to be stored or updated, e.g. service not available, MMBoxes not supported, MMBox not enabled, MMBox over quota, MMBox system full, MMBox system I/O error.

If the MMS Relay/Server does not provide the MM1_mmbox_store.RES, the MMS User Agent should assume that the MM was not stored or updated, and should be able to recover.

8.1.7.3 Features

Message Reference: The message reference, in MM1_mmbox_store.REQ, indicates the MM to be stored or updated. This reference can be from MM1_notification.REQ, or the message reference from any of the store request responses (e.g.: MM1_mmbox_store.RES, MM1_mmbox_view.RES, MM1_forward.RES with Store, MM1_submit.RES with Store). The message reference, in MM1_mmbox_store.RES, indicates a reference to the newly stored or updated MM, suitable for subsequent usage.

MM State: The MMS User Agent may request that the MM be stored, or updated, with a specific MM State. In the absence of this value when the Message Reference refers to a new MM (i.e.: from MM1_notification.REQ), the default shall be the New state. In the absence of this value when the Message Reference refers to an MM already stored, the MM State will not be changed.

MM Flags: if present, one or more keyword values. In the absence of this element, no values are assumed for newly stored MMs and no changes made for already stored MMs.

Store Status: The MMS Relay/Server shall indicate the status of the MM1_mmbox_store.REQ in the Store Status information element of the associated MM1_mmbox_store.RES. The Store Status information element of the MM1_mmbox_store.RES may be supported with an explanatory text. If this text is available in the Store Status Text information element the MMS User Agent should bring it to the user's attention. The choice of the language used in the Status text information element is at the discretion of the MMS service provider.

8.1.7.4 Information Elements

Table 23: Information elements in the MM1_mmbox_store.REQ

Information element	Presence	Description
Message Reference	Mandatory	The message reference from a MM1_notification.REQ or any previous store or MMBox view operation.
MM State	Optional	The state of the MM. If not present when the Message Reference is from a notification request, defaults to New. No value is assumed when the Message Reference refers to an already stored MM.
MM Flags	Optional	The keyword flags of the MM. There are no defaults.

Table 24: Information elements in the MM1_mmbox_store.RES

Information element	Presence	Description
Message reference	Mandatory	A reference to the newly stored or updated MM, suitable for subsequent usage (eg: with MM1_retrieve.REQ and MM1_mmbox_delete.REQ).
Store Status	Mandatory	The status of the MM store operation.
Store Status Text	Optional	Description which qualifies the status of the MM store request.

8.1.8 View the MMBox

This part of the MMS service describes the mechanism by which an MMS User Agent may request a listing of the MMs contained within the subscriber's MMBox. The MMS User Agent shall issue the request to view selected portions of MMs within the subscriber's MMBox, as well as information about the MMBox itself, from the corresponding MMS Relay/Server.

Involved abstract messages are outlined in Table 19 from type and direction points of view.

Table 19: Abstract messages for viewing the MMBox

Abstract messages	Type	Direction
MM1_mmbox_view.REQ	Request	MMS UA -> MMS Relay/Server
MM1_mmbox_view.RES	Response	MMS UA <- MMS Relay/Server

8.1.8.1 Normal Operations

- The MMS User Agent will issue an MM1_mmbox_view.REQ message, containing optional request qualifiers, to the MMS Relay/Server. The MMS Relay/Server will respond with an abstract message, MM1_mmbox_view.RES, containing the resulting view data as the content of the abstract message. This information shall consist of a listing of the MMBox contents, possibly including information about the MMBox itself.

When the Start and Limit attributes are used, several pairs of MM1 mmbox_view.REQ and MM1_mmbox_view.RES transactions might be used in order to acquire the complete set of results.

8.1.8.2 Abnormal Operations

In this case the originator MMS Relay/Server shall respond with a MM1_mmbox_view.RES encapsulating a status which indicates the reason the operation could not be completed, e.g. corrupted abstract message, no subscription, service not available, MMBox not supported, MMBox not enabled, MMBox I/O error.

If the MMS Relay/Server does not provide the MM1_mmbox_view.RES the MMS User Agent should be able to recover.

8.1.8.3 Features

Attributes list: A list of information element names that are used in the MM1_mmbox_view.REQ, which request corresponding information elements from the MMs to be conveyed in the MM1_mmbox_view.RES. The list of known information element names are those currently defined for the MM1_retrieve.RES and MM1_notification.REQ. In the absence of the Attributes list information element, the MMS Relay/Server shall, by default and if available, select these information elements from each viewed MM: Message ID, Date and time, Sender address, Subject, Message size, MM State, and MM Flags.

Message Selection: Messages which are to be viewed may be selected by a list of Message References or by a selection based on MM State and/or MM Flags keywords. Either Message Reference List or Select may be supplied in the MM1_mmbox_view.REQ, which selects MMs for inclusion in the content in the MM1_mmbox_view.RES. In the absence of the Message Reference List, if Select is present and if any of the select keywords matches either the MM State or any of the MM flags on an MM in the MMBox, the requested information elements of the MM shall be included in the MM1_mmbox_view.RES (example: "Select: new" or "Select: draft"). The absence of both the Message References List and the Select information elements shall yield a listing of all MMs currently stored within the MMBox.

Partial views: MMBox view results may be received in its entirety, or may be indexed to start the view at a given MM offset relative to the selected MMs, and/or may be limited to finite number of MMs to be viewed. The Start information element is a number that may be used in the MM1_mmbox_view.REQ to index the first MM to be viewed, relative to the selected set of MMs, allowing partial views to be requested. If Start is absent, the first selected MM will begin the view results. The Limit information element is a number that may be provided in the MM1_mmbox_view.REQ to specify a limit for the number of MMs the information elements to which shall be returned in the MM1_mmbox_view.RES. If Limit is absent, all of the remaining MMs shall be returned.

MMBox Information: The Totals information element, if present on the request, indicates that the MMBox totals are requested. In the response, the Totals information element value shall be the total number of messages and/or total size, with the units (e.g.: Messages or Bytes) identified. The Quotas information element, if present on the request, indicates that the MMBox quotas, in terms of messages and/or size, are requested. In the response, the Quotas information element value shall be the quotas as the maximum number of messages allowed and/or the maximum size allowed, with the units (e.g.: Messages or Bytes) identified.

MM Listing: a list of information elements from the MMs returned within the MM1_mmbox_view.RES. The listing shall consist of the following information elements, separately grouped for each MM returned in the list:

- Message reference: a unique reference to an MM
- Information elements corresponding to those requested in the Select information element on the MM1_mmbox_view.REQ;

Status: This will be the status code for any failures of the MM1_mmbox_view.REQ command.

Status Text: This may be returned with an error status code to provide additional explanatory text.

8.1.8.4 Information Elements

Table 20: Information elements in the MM1_mmbox_view.REQ

Information element	Presence	Description
Attributes list	Optional	A list of information elements that are to be returned as a group for each MM to be listed in the MM1_mmbox_view.RES. If absent, the default list shall apply.
Message Reference list	Optional	One or more Message References which are to have their information elements listed.
Select	Optional	A list of MM State or MM Flags keywords, by which MMs within the MMBox can be selected, if the Message Reference list is absent.
Start	Optional	A number, indicating the index of the first MM of those selected to have information elements returned in the response. If this is absent, the first item selected is returned.
Limit	Optional	A number indicating the maximum number of selected MMs to their information elements returned in the response. If this is absent, information elements from all remaining MMs are returned.
Totals	Optional	Indicates that the current total number of messages and/or size contained by the MMBox are requested
Quotas	Optional	Indicates that the current message and/or size quotas are requested

Table 21: Information elements in the MM1_mmbox_view.RES

Information element	Presence	Description
MM Listing	Conditional	The requested listing of the selected MMs, which shall be one or more groups of information elements, one for each MM listed. Each MM group shall include: a Message Reference, and may include additional information elements as well. If absent, no MMs were found or selected.
Status	Conditional	If an error occurs, this is a code indicating the exact cause of the error. For successful responses, the Status may be returned with a corresponding success code.
Status Text	Optional	If an error occurs, this may contain explanatory text that corresponds to the error code.
Totals	Conditional	The total number of messages and/or bytes for the MMBox, identified with Messages or Bytes, respectively, depending upon the presence of Totals in the request.
Quotas	Conditional	The quotas of the MMBox in messages and/or bytes identified with Messages or Bytes, respectively, depending upon the presence of Quotas in the request.

8.1.9 Uploading and Persistently Storing Multimedia Messages

This section describes the uploading and storage of an MM into the subscriber's MMBox. Requests from an MMS User Agent to upload and store MMs in the subscriber's MMBox shall be sent to the corresponding MMS Relay/Server. Involved abstract messages are outlined in the table below from type and direction points of view.

Table 22: Abstract messages for uploading and storing MMs

Abstract messages	Type	Direction
MM1_mmbox_upload.REQ	Request	MMS UA -> MMS Relay/Server
MM1_mmbox_upload.RES	Response	MMS UA <- MMS Relay/Server

8.1.9.1 Normal operation

The MMS User Agent shall submit a request to upload and store an MM into the MMBox using the MM1_mmbox_upload.REQ, which contains MMS control information and the MM content.

The MMS Relay/Server shall respond with an MM1_mmbox_upload.RES, which provides the status of the store request. The MM1_mmbox_upload.RES shall unambiguously refer to the corresponding MM1_mmbox_upload.REQ.

Support for MM1_mmbox_upload.REQ is optional for the MMS UA, support for MM1_mmbox_upload.RES is mandatory for the MMS Relay/Server.

8.1.9.2 Abnormal Operation

In this case the MMS Relay/Server shall respond with a MM1_mmbox_upload.RES encapsulating a status which indicates the reason the multimedia message was not accepted, e.g. service not available, MMBoxes not supported, MMBox not enabled, MMBox over quota, MMBox system full, MMBox system I/O error.

If the MMS Relay/Server does not provide the MM1_mmbox_upload.RES the MMS User Agent should assume that the MM was not stored, and should be able to recover.

8.1.9.3 Features

Addressing: One or several MM recipients and the originator of a submitted MM may be indicated in the addressing-relevant information field(s) of the MM1_mmbox_upload.REQ. It is possible for incompletely composed MMs to be stored, which means that the addressing-relevant information fields may be empty.

Time stamping: The originator MMS User Agent may time stamp the MM.

Message class, priority and subject: The MM may be qualified further by adding a message class, priority and/or subject to the MM in the MM1_mmbox_upload.REQ. Additional qualifiers may be added.

Identification: For an MM that has been stored persistently, the MMS Relay/Server shall always provide a message identification in the MM1_mmbox_upload.RES.

MM State: The MMS User Agent may request that the submitted MM be stored with a specific MM State. In the absence of this value, the default shall be the Draft state.

MM Flags: if present, one or more keyword values.

Content Type: The MIME type of the MM shall always be identified.

Content: The content of the MM to be uploaded and stored.

Request Status: The MMS Relay/Server shall indicate the status of the MM1_mmbox_upload.REQ in the associated MM1_mmbox_upload.RES. The reason code given in the status information element of the MM1_mmbox_upload.RES may be supported with an explanatory text further qualifying the status. If this text is available in the status text information element the MMS User Agent should bring it to the user's attention. The choice of the language used in the status text information element is at the discretion of the MMS service provider.

8.1.9.4 Information Elements

Table 23: Information elements in the MM1_mmbox_upload.REQ

Information element	Presence	Description
Recipient address	Optional	The address of the recipient(s).
Sender address	Optional	The address of the MM originator.
Message class	Optional	The class of the MM (e.g., personal, advertisement, information service)
Date and time	Optional	The time and date of the upload of the MM (time stamp).
Time of Expiry	Optional	The desired time of expiry for the MM or reply-MM.
Earliest delivery time	Optional	The earliest desired time of delivery of the MM to the recipient.
Priority	Optional	The priority (importance) of the message.
MM State	Optional	The state of the MM. Will default to the Draft state if absent.
MM Flags	Optional	The keyword flags of the MM. There are no defaults.
Subject	Optional	The title of the whole multimedia message.
Content type	Mandatory	The content type of the MM's content
Content	Mandatory	The content of the multimedia message

Table 24: Information elements in the MM1_mmbox_upload.RES

Information element	Presence	Description
Message reference	Mandatory	A reference to the newly stored MM, suitable for subsequent usage (e.g.: with MM1_retrieve.REQ, MM1_mmbox_delete.REQ, etc.).
Status	Mandatory	The status of the MM upload operation.
Status Text	Optional	Description which qualifies the status of the MM submit request.

8.1.10 Deletion of Stored Multimedia Messages

This section describes the deletion of one or more Multimedia Messages (MMs) from the subscriber's MMBox. Requests from an MMS User Agent to delete MMs from the subscriber's MMBox will always be sent to the corresponding MMS Relay/Server. Involved abstract messages are outlined in the table below from type and direction points of view.

Table 25: Abstract messages for MM deletion in MMS

Abstract messages	Type	Direction
MM1_mmbox_delete.REQ	Request	MMS User Agent -> MMS Relay/Server
MM1_mmbox_delete.RES	Response	MMS User Agent <- MMS Relay/Server

8.1.10.1 Normal Operations

The MMS User Agent may issue an MM1_mmbox_delete.REQ message to the MMS Relay/Server with one or more Message References. The MMS Relay/Server shall perform the requested deletions and return an MM1_mmbox_delete.RES which shall contain a successful response code, or shall contain any error status and optional text.

If multiple Message References are successfully deleted, the response shall contain only a successful Status code and no Message Reference.

Support for MM1_mmbox_delete.REQ is optional for the MMS UA, and mandatory for the MMS Relay/Server, if MMBoxes are supported.

8.1.10.2 Abnormal Operations

In this case the MMS Relay/Server shall respond with a MM1_mmbox_delete.RES encapsulating a status which indicates the reason the multimedia message was not deleted, e.g. corrupted abstract message, invalid message reference, service not available, MMBoxes not supported, MMBox not enabled, MMBox system I/O error.

If the MMS Relay/Server does not provide the MM1_mmbox_delete.RES the MMS User Agent should be able to recover.

When multiple Message References are submitted for deletion and an error occurs, then the Message Reference of each MM in error will be returned with an appropriate error code and text.

8.1.10.3 Features

Message Reference: The message reference indicating the MM to be deleted. Multiple message references may be given, allowing multiple MMs to be deleted within the same transaction.

Request Status: The MMS Relay/Server shall indicate the status of the MM1_mmbox_delete.REQ in the associated MM1_mmbox_delete.RES. The reason code given in the status information element of the MM1_mmbox_delete.RES may be supported with an explanatory text further qualifying the status. If this text is available in the status text information element the MMS User Agent should bring it to the user's attention. The choice of the language used in the status text information element is at the discretion of the MMS service provider.

8.1.10.4 Information Elements

Table 26: Information elements in the MM1_mmbox_delete.REQ

Information element	Presence	Description
Message Reference	Mandatory	The Message Reference of the message to be deleted; this element may occur multiple times, once for each MM to be deleted.

Table 27: Information elements in the MM1_mmbox_delete.RES

Information element	Presence	Description
Message Reference	Conditional	A reference to the message in error, if any, to which the following information elements apply
Status	Mandatory	The status of the MM deletion request; multiple Statuses may occur, each one referring to the immediately preceding Message Reference.
Status Text	Optional	Description which qualifies the status of the MM deletion request; multiple Status Text entries may occur, each one corresponding to the immediately preceding Status.

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Sophia Antipolis, France
11-15 February 2002

T2-020261

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **053** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☐

Title:	⌘	VASP-related CDR generation
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	13.02.2002
Category:	⌘	**B**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change:	⌘	VASP-related CDR generation is not defined yet
Summary of change:	⌘	The MMS Relay/Server should generate charging events for all operations invoked, directly or indirectly, by VASP operations.
Consequences if not approved:	⌘	It would remain unclear when the MMS Relay/Server generates charging events with respect to VASP operations.

Clauses affected:	⌘	4.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

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2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

• • •

4.2 Involved MMS Elements

Figure 2 shows that multimedia messaging may encompass many different network types. The basis of connectivity between these different networks shall be provided by the Internet protocol and its associated set of messaging protocols. This approach enables messaging in 2G and 3G wireless networks to be compatible with messaging systems found on the Internet.

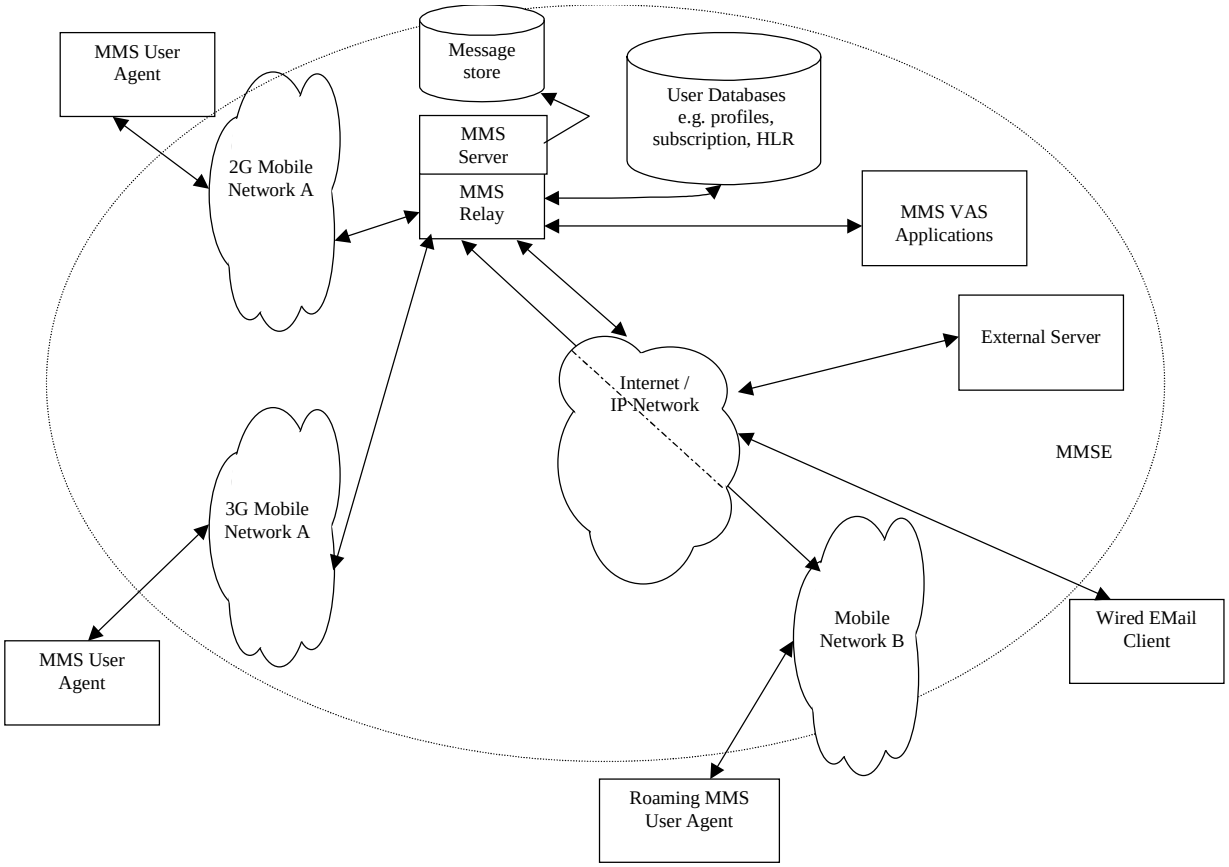

Figure 2: MMS Architectural Elements

MMSNA

The Multimedia Messaging Service Network Architecture encompasses all the various elements that provide a complete MMS to a user (including interworking between service providers).

MMSE

The MMSE is a collection of MMS-specific network elements under the control of a single administration. In the case of roaming the visited network is considered a part of that user's MMSE. However, subscribers to another service provider are considered to be a part of a separate MMSE.

MMS Relay/Server

The MMS Relay/Server is responsible for storage and handling of incoming and outgoing messages and for the transfer of messages between different messaging systems. Depending on the business model, the MMS Relay/Server may be a single logical element or may be separated into MMS Relay and MMS Server elements. These may be distributed across different domains.

The MMS Relay/Server should be able to generate charging data (Call Data Record - CDR) when receiving MMs from or when delivering MMs to another element of the MMSNA. The MMS Relay/Server should be able to generate charging data for VASP-related operations.

MMS User Databases

This element may be comprised of one or more entities that contain user related information such as subscription and configuration (e.g. user profile, HLR).

MMS User Agent

The MMS User Agent resides on a UE, an MS or on an external device connected to a UE/MS. It is an application layer function that provides the users with the ability to view, compose and handle MMs (e.g. submitting, receiving, deleting of MMs).

MMS VAS Applications

The MMS VAS Applications offer Value Added Services to MMS users. There could be several MMS VAS Applications included in or connected to an MMSE. MMS VAS Applications may be able to generate CDRs.

4.3 Addressing

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3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020219

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **052** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Support of Reply-Charging in MM7
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	February 5th, 2002
Category:	⌘	**B**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	Service behaviour section does not recognize MM7 and VASP although Reply-Charging is supported in Reference point MM7
Summary of change:	⌘	Added VASP as an originator of Reply-charge request and recipient of Reply message
Consequences if not approved:	⌘	MM7 reference point supports Reply-Charge but service behaviour is unclear

Clauses affected:	⌘	7.1.10
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	For MCC: There are two changes marked with yellow background in this CR. There were underlines for some reason. Those are removed.

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

7.1.10 Support for Reply-Charging in MMS

The MMS User Agent may support reply-charging. If the MMS User Agent supports this feature ~~it is expected that~~ the MMS User Agent shall support~~s~~ the following behaviour.

The MMS Relay/Server may support reply-charging. If the MMS Relay/Server supports this feature ~~it is expected that~~ the MMS Relay/Server shall support~~s~~ the following behaviour.

The VASP connected to an MMS Relay/Server over MM7 may support reply-charging. If the VASP supports this feature the VASP shall support the following behaviour.

A User of the MMS (the originator MMS User Agent or VASP) may be able to take over the charge for the sending of a reply-MM to their submitted MM from the recipient(s). Therefore the originator of an MM (either MMS User Agent or VASP) should be able to mark the MM as reply-charged. The originator's MMS Relay/Server could either accept the user's or VASP's settings for reply-charging or not and should be able to convey feedback to the originator. It should be possible to take over the charge for reply-MMs from different recipients.

The recipient should be notified if she is not charged for a reply-MM to this particular MM. However, the indication of reply-charging covers only the willingness/fact that a reply-MM to an original MM is free of charge, not that the retrieval of the original MM marked as reply-charged is free of charge. Both the originator and the recipient MMS Relay/Server shall be able to control that not more than one reply-MM per recipient is charged to the originator. The MMS User Agent may indicate to the user if an MM has already been replied to.

The request for reply-charging shall not be passed on to the recipient

- if the recipient is not known to belong to an MMSE peer entity, or
- in the case the MM is forwarded.

NOTE: For this release the following limitations apply: Support for reply-charging in MMS is restricted to MMS User Agents and VASPs belonging to the same MMSE, i.e. originator and recipient MMSE are identical. Reply-charging allows only one reply-MM per recipient, i.e. reply-charging applies to the first successful submission of an MM sent as a reply. Furthermore, a reply-MM is restricted to text only. These limitations may be elaborated further in future releases.

In addition to the service behaviour described in previous clauses the following behaviour is expected to support reply-charging in MMS.

Within the submission of an MM the MM originator (either MMS User Agent or VASP) may indicate a willingness to pay the charge for one reply-MM per MM recipient. In this case the originator MMS User Agent or originator VASP:

- shall indicate the sender's willingness to pay the charge for one reply-MM per MM recipient,
- may define a reply-charging limitation request (e.g. may specify the latest time of submission of the reply-MMs or a maximum size of reply-MMs).

In a response to the MM submission the originator MMS Relay/Server shall inform the MM originator (either MMS User Agent or VASP) whether or not it accepts

- the originator's request for reply-charging in the original MM,
- the reply-charging limitations set by the originator (either MMS User Agent or VASP) in the original MM.

Upon reception of an MM from an originator (either MMS User Agent or VASP) the originator MMS Relay/Server

- may provide reply-charging limitations, i.e. it may also override by further limiting the MMS User Agent's or VASP's settings for reply-charging limitations,
- shall pass the indication whether or not a reply-MM is requested unaltered when routing the original MM towards the MM recipient(s) if the peer entity is known to be the same MMS Relay/Server,

- shall pass the reply-charging limitations for the reply-MM when routing the original MM towards the MM recipient(s) if the peer entity is known to be the same MMS Relay/Server.

If the MM recipient has requested the original MM to be forwarded to some other address the recipient MMS Relay/Server

- shall not pass any information about the reply-charging request towards the addressee(s) of the forwarding request.

If reply-charging has been requested by the MM originator (either MMS User Agent or VASP) the recipient MMS Relay/Server

- should inform the recipient MMS User Agent with the MM notification and upon MM delivery that the MM originator is willing to pay for a reply-MM to this original MM.
- may notify the recipient about the reply-charging limitations set by the orginator (e.g. the latest time of submission of a reply-MM to the original MM).

When a user intends to send a reply-MM to the MM originator (to the originator MMS User Agent or to the VASP) the recipient MMS User Agent (which is the originator MMS User Agent of the reply-MM):

- shall mark the MM as a reply-MM,
- shall provide the message-ID of the original MM which it replies to (if it is the reply-MM),
- shall submit the reply-MM to the recipient MMS Relay/Server,
- may be able to indicate to the user whether this MM has already been replied to,
- may be able to indicate to the user if the reply-charging limitations can not be met.

Upon submission the recipient MMS Relay/Server

- shall reject the reply-MM submission attempt and should convey this information back to the recipient MMS User Agent (which is the originator MMS User Agent of the reply-MM) if the reply-MM submission attempt does not meet the limitations set by the originator (either MMS User Agent or VASP),
- shall be able to uniquely map the reply-MM to the original MM.

3GPP TSG-T2#16
Sophia Antipolis, France
11-15 February 2002

T2-020215

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **051** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☒ Radio Access Network ☐ Core Network ☐

Title:	⌘	Reply-charging bug fixes
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	February 11, 2002
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	Lack of consistency with respect to the reply-charging feature in clause 7.1.1
Summary of change:	⌘	Mention Reply-charging function in 7.1.1
Consequences if not approved:	⌘	Consistency issues between different sections in 23.140

Clauses affected:	⌘	7.1.1
Other specs affected:	⌘	☒ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

7 MMS Service Behaviour Description

7.1 MMS services offered

7.1.1 Submission of a Multimedia Message in the originator MMSE

When a user intends to send an MM to one or several destinations the MM shall be submitted to the originator MMS Relay/Server.

The support for submission of MMs is optional for MMS User Agents. The support for submission of MMs is mandatory for MMS Relay/Servers.

If an MMS User Agent supports submission of MMs the MMS User Agent shall be able to:

- Indicate the address of the MM recipient
- Identify the MIME content type of the message.

If a MMS User Agent supports submission of MMs the MMS User Agent may be able to:

- Request a delivery report for the message
- Request a read-reply report for the message
- Provide a time stamp for the time of submission of the message
- Set the earliest desired time of delivery for the message
- Set the desired time of expiry for the message
- Indicate the address of the MM originator
- Set further message qualifications (e.g. priority, message class, subject)
- Request the MM originator's address being hidden from the recipient MMS User Agent~~.~~
- Indicate the sender's willingness to pay the charge for one reply-MM per recipient
- ~~Define~~ Indicate a reply-charging limitation ~~request.~~

Upon reception of an MM from an originator MMS User Agent the originator MMS Relay/Server

- shall assign a Message Identification to the MM and immediately provide the originator MMS User Agent with this Message Identification
- is responsible for retaining the MM until the earliest desired time of delivery, if the optional feature of earliest time of delivery is supported by the originator MMS Relay/Server. If this feature is not supported then the MM is immediately routed forward.
- may provide a time stamp, i.e. it may also override the MMS User Agent's time stamp,
- shall insert the originator's address into the MM if not yet provided by the originator MMS User Agent
- shall pass the originator's address to the peer entity if the peer entity is known to be a MMS Relay/Server
- shall route forward the request for address hiding unaltered to the recipient MMS Relay/Server if the peer entity is known to be an MMS Relay/Server .
- shall pass the originator's address to the peer entity if the peer entity is not known to be an MMS Relay/Server and address hiding has not been requested by the originator MMS User Agent

- shall not pass the originator's address to the peer entity and should override the address provided by the originator MMS User Agent in the MM to an "anonymous" address if the peer entity is not known to be an MMS Relay/Server and address hiding has been requested by the originator MMS User Agent
- may override the address provided by the originator MMS User Agent in the MM (subject to MMS service provider's preferences)
- is responsible for resolving the MM recipient's address(es),
- is responsible to route the MM towards the MM recipients.
- should pass the indication whether or not a delivery report is requested unaltered when routing the MM towards the MM recipient(s)
- shall pass the indication whether or not a read-reply report is requested unaltered when routing the MM towards the MM recipient(s)
- shall pass the indication about MIME content type of the message and message qualifications (e.g. priority, message class, subject) unaltered when routing the MM towards the MM recipient(s)
- shall generate a delivery report indicating "indeterminate" status of the MM's delivery if a delivery report was requested by the originator MMS User Agent and if the peer entity the MM is routed forward to is not known by the originator MMS Relay/Server.

A special case is where the recipient MMS Relay/Server is also the originator MMS Relay/Server. In this case the MM does not have to be routed forward.

7.1.2 Reception of a Multimedia Message in the recipient MMSE

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3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020211

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **050** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Recipient MSISDN address resolution
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	February 12th, 2002
Category:	⌘	**B**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	This CR describes the recipient MSISDN address resolution mechanism including MNP considerations.
Summary of change:	⌘	Addition of an annex on the description of the DNS-ENUM protocol use for MMS and specification of MMS NAPTR Resource Record. Addition of an annex on an interim recipient MSISDN address resolution based on IMSI.
Consequences if not approved:	⌘	Proprietary solutions on recipient MSISDN address resolution and MNP may create interoperability, deployment and operational problems to Operators.

Clauses affected:	⌘	2, 4.3, 7.2.1, 8.4, 8.4.5.1, Annex F, Annex G, Annex H
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document.*

[1] 3GPP TS 22.140: "Multimedia Messaging Service; Stage 1".

[2] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[3] WAP Forum: "Wireless Application Environment Specification, Version 1.2", WAP-WAESpec-19991104, . URL: http://www.wapforum.org/.

[4] 3GPP TS 23.057: "Mobile Execution Environment (MExE); Functional description; Stage 2".

[5] IETF; STD 0011 (RFC 2822): "Internet Message Format", URL: http://www.ietf.org/rfc/rfc2822.txt.

[6] IETF; RFC 2046: "Multipurpose Internet Mail extension (MIME) Part Two: Media Types", URL: http://www.ietf.org/rfc/rfc2046.txt.

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4.3 Addressing

MMS shall support the use of E-Mail addresses (RFC 822) [5] or MSISDN (E.164) or both to address the recipient of an MM. MMS may support the use of service provider specific addresses to address the recipient of an MM. In the case of E-Mail addresses standard internet message routing should be used.

The usage of MSISDN for addressing a recipient in a different MMS service provider's domain shall be possible. For that the need of MSISDN translation to a routable address has been identified. Service provider specific addresses may be used to e.g. deliver messages to MMS VAS Application within one MMSE.

MMS connectivity across different networks (MMSEs) is provided based on Internet protocols. According to this approach, each MMSE should be assigned a unique domain name (e.g. mms.operatora.net).

MMS recipient addresses provided by an MMS User Agent may be in a format of an RFC 822 routable address, e.g. E-Mail address, or other formats, such as E.164 or service provider specific addresses. In those cases where a non-routable address is used to specify a recipient and the recipient belongs to another MMSE or the recipient is outside of any MMSE, it is required to translate the address to an RFC 822 routable address format. It is the sender MMS Relay/Server's responsibility to make this mapping before routing forward the message to the recipient's MMS Relay/Server.

The mapping to the correct recipient's MMS Relay/Server domain name is described in clause 7.2.1.~~left for standardisation in future releases. It is expected that ENUM (an IETF global numbering proposal) will be used in future releases as the mechanism to map MSISDN numbers to RFC 822 routable addresses. In the mean time, it is expected that MMS service providers or network operators may use solutions for their particular needs which may include static tables or other look-up methods.~~

MMS shall support address hiding i.e. anonymous messages where the sender's address is not shown to the recipient MMS User Agent. If the peer entity is not known to be an MMS Relay/Server the originator MMS Relay/Server shall not provide the originator address. If the peer entity is known to be an MMS Relay/Server, both the originator address and request of address hiding shall be forwarded to the recipient MMS Relay/Server. The recipient MMS Relay/Server is responsible not to show the originator address to the recipient MMS User Agent.

7.2 MMSE Addressing responsibilities

Address parsing:

MMS Relay/Server should parse the recipient address field provided by the originator MMS User Agent upon MM submission. If an error is found in the address format, an error indication should be sent back to the MMS User Agent in the submit response.

Locating the recipient:

For each recipient that appears in an MM, the MMS Relay/Server shall be able to resolve whether the recipient belongs to the same MMSE, another MMSE or is not known to belong to any MMSE. If the recipient belongs to the same MMSE, the MMS Relay/Server shall notify the recipient of the new MM as described in clause 7.1.2. If the recipient appears to belong to another MMSE, the MMS Relay/Server has to locate the external recipient's MMSE domain. If the recipient is not known to belong to any MMSE, the MMS Relay/Server shall perform the necessary conversion and route forward the message to the recipient.

7.2.1 Address Formats on MM4

Resolving the recipient's MMSE IP address:

For those recipients that appear in an MM and belong to an external MMSE, the originator MMS Relay/Server has to send the message to each of the recipient~~'~~s' MMS Relay/Servers using the protocol described in clause 7.7. The MMS Relay/Server has to resolve the recipient's MMS Relay/Server domain name to an IP address, e.g. using DNS, based on

the recipient's address. The mapping for the recipient's address, in case of MSISDN (E.164) addressing, to the recipient's MMS Relay/Server if the MM recipient belongs to another MMSE should ~~is~~use the DNS-ENUM protocol [58]. The ENUM solution is described in Annex F. In the absence of an ENUM based solution, it is expected that MMS service providers or network operators may use solutions for their particular needs, which may include static tables or other look-up methods. One such look up method, which is based on MSISDN to IMSI look up, is described in Annex G.

~~left for standardisation in future releases. It is expected that ENUM mechanism will be used for this resolution. In the mean time,MMS service providers or network operators may use solutions for their particular needs, which may include static tables or other look-up methods.~~

Re-formatting the sender's and recipient's address to FQDN format

When delivering a message from an MMSE to another MMSE, both the sender and the recipient addresses shall be extended to include the FQDN to enable transport over SMTP. This FQDN format shall be used in the MM4 reference point. It is required that FQDN format address is used in "MAIL FROM: " and "RCPT TO: " commands in SMTP, it is not necessary that the originator's and recipient's addresses in [5]~~RFC 822~~ "From: " or "To"–fields are re-formatted to FQDN format.

The encoding of FQDN addressing is defined in Clause 8.4.5.1.

7.2.2 Address Formats on MM1

The MMS addressing model on MM1 contains three addresses: the address of the MMS Relay/Server, the address of the recipient and the address of the originator. The address of the MMS Relay/Server shall be the URI of the MMS Relay/Server given by the MMS service provider. Thus, the URI needs to be configurable in the MMS User Agent.

The originator's and the recipient's address could be either a user's address or a user's terminal address. For this release the user's terminal addresses (e.g. terminal IP addresses) are not supported. The MMS User Agent's responsibility is to format these addresses before it submits the message to the originator MMS Relay/Server.

The reference point MM1 should support E.164 (MSISDN) and/or RFC822 addressing, and it should support a way to indicate the used address type to enable future extension. The encoding of the addressing is up to the corresponding implementation.

E.g. the originator MMS User Agent may specify each of the address fields in one of the following formats:

1) RFC 822 address (FQDN) ["/TYPE= rfc822"]
2) +E.164 ["/TYPE= PLMN"] as [[CC] + NC] + SN
3) Other "/TYPE= "

The "/TYPE= " field specifies the address type. When E.164 or RFC822 formats are used the type is optional. The "/TYPE= " convention provides flexibility for future enhancements.

8.4 Technical realisation of MMS on reference point MM4

An MMSE shall ~~may~~ be able to discover a peer MMSE as described in clause 7.2.1. This clause defines the interworking between MMS Relay/Servers once the peer systems are aware of each other being an MMSE.

~~Future releases may elaborate how peer MMSEs discover each other. In the mean time, it is expected that MMS service providers or network operators will develop solutions for their particular needs which may include static tables or other look-up methods.~~

8.4.5 Message Transfer Protocol on MM4

Interworking between different MMSEs shall be based on SMTP according to STD 10 [22] as depicted in figure 5.

The originator MMS Relay/Server should use an SMTP connection to transfer MMs/abstract messages. The originator MMS Relay/Server should use the sender's address as indicated in the corresponding MM/abstract message in the SMTP "MAIL FROM:" command (subject to the sender's visibility) and should use the recipient's address(es) as indicated in

the corresponding MM/abstract message in the SMTP "RCPT TO:" command. The originator MMS Relay/Server should use SMTP "DATA" command to transfer the message.

Private agreements may utilise additional connection and security (e.g. IPSec) methods. Such methods are out of the scope of standardisation for this release.

8.4.5.1 Address Encoding

In the case where E.164 addressing is used and the address resolution returns an RFC 2822 recipient address (ENUM based resolution), this address shall become the 'forward-path' argument to the 'RCPT TO:' SMTP command as it is described in [22]. The 'Reverse-Path' argument to the 'MAIL FROM:' SMTP command shall be determined by the originator MMS Relay/Server as it is described in [22].

In the case where E.164 addressing is used and the address resolution returns only the domain of the recipient MMSE, the addresses shall be encoded in the following way:

SMTP protocol level:

```
SMTP-address = MMS-address "@" domain

MMS-address = "+" E.164 "/TYPE=PLMN"

E.164 = 1*DIGIT

domain = dom-fragment *( "." dom-fragment )

dom-fragment = ( ALPHA | DIGIT ) *( ALPHA | DIGIT | "-" )
```

Example:

If the originator's address was an E.164 address, the address fields used in RCPT shall be converted to the following format by the sender's MMS Relay/Server:

+E.164/TYPE=PLMN@recipient-mmse

where recipient-mmse is a FQDN of the recipient's MMS Relay/Server, e.g.

+358401234567/TYPE=PLMN@mmse.sonera.net

SMTP commands:

SMTP commands should be then used in the following way:

```
MAIL FROM: SMTP-address

RCPT TO: SMTP-address

DATA

X-MMS-3GPP-MMS-version: 4.2.0

X-MMS-Message-Type: MM4_forward.REQ

X-MMS-Transaction-ID: "ABCDEFGHIJ0123456789"

X-MMS-Message-ID: "originator-mmse/originator-username/123456789"

Date: Wed, 16 May 2001 10:35:00 +0800

From: MMS-address

To: MMS-address

Subject: Greetings from Greece

Content-Type: text/plain


Hi, …
```

.

NOTE: In the example above the "X-MMS-3GPP-MMS-version" header may not refer to the current version of the present document.

Annex F (normative): DNS-ENUM recipient MSISDN address resolution.

For those recipients MSISDN addresses that appear in an MM and belong to an external MMSE, the originator MMS Relay/Server shall translate (resolve) them to a routable RFC 2822 [5] address that shall be used in the “RCPT TO” SMTP subsequent commands.

DNS-ENUM recipient MSISDN address resolution procedure:

1. The originator MMS Relay/Server shall ensure that the recipient address (MSISDN) complies with the E.164 address format and includes the ‘+’ character. In the case of national or local addressing scheme (e.g. only operator code followed by a number), the MMS Relay/Server shall convert the national or local number to an E.164 address format.

   EXAMPLE 1: +30-697-123-4567

   EXAMPLE 2: In case of number conversion 6971234567 is converted to +306971234567

2. The originator MMS Relay/Server shall remove all non-digit characters with the exception of the leading '+'.

   EXAMPLE: +306971234567

3. The originator MMS Relay/Server shall remove all characters with the exception of digits.

   EXAMPLE: 306971234567

4. The originator MMS Relay/Server shall put dots (".") between each digit.

   EXAMPLE: 3.0.6.9.7.1.2.3.4.5.6.7

5. The originator MMS Relay/Server shall reverse the order of the digits.

   EXAMPLE: 7.6.5.4.3.2.1.7.9.6.0.3

6. The resulting subdomain (result of step 5) shall be converted to a FQDN by appending an appropriate string. The specific string depends on the administrative control of the ENUM implementation.

   EXAMPLES: 7.6.5.4.3.2.1.7.9.6.0.3.e164.arpa (public top level domain), 7.6.5.4.3.2.1.7.9.6.0.3.e164.gsm (private top level domain), 7.6.5.4.3.2.1.7.9.6.0.3.e164.gprs (private top level domain), etc.

7. The resulting FQDN together with the string (E.164 number) in the form as specified in step 2 above, shall be used as the input to the NAPTR algorithm [57] by the originator MMS Relay/Server.

8. The output may result in one of the following cases:

   a. E.164 number not in the numbering plan. The originating MMS Relay/Server shall invoke an appropriate address resolution exception handling procedure (e.g. send a message to the originating MMS User Agent reporting the error condition).

   b. E.164 number in the numbering plan, but no URIs exist for that number. The originating MMS Relay/Server shall invoke an appropriate address resolution exception handling procedure (e.g. send a message to the originating MMS User Agent reporting the error condition, perform the necessary conversion and route forward the message to the recipient via MM3, etc.).

   c. E.164 number in the numbering plan, but no MMS URIs (MMS URIs are of the form “mms:mailbox” and they are defined in the MMS Resource Record section) exist for that number. The originating MMS Relay/Server shall invoke an appropriate address resolution exception handling procedure (e.g. send a message to the originating MMS User Agent reporting the error condition, perform the necessary

conversion and route forward the message to the recipient via MM3 using the appropriate URI based on the Service field, etc.).

d. DNS ENUM service unavailable. The originating MMS Relay/Server shall invoke an appropriate address resolution exception handling procedure (e.g. send a message to the originating MMS User Agent reporting the error condition, store the message in the queue and retry at a later time, etc.).

e. E.164 number in the numbering plan and MMS URIs exist for that number.

EXAMPLE: The following is an example of NAPTR Resource Records associated with the FQDN derived from the recipient MSISDN address (+306971234567)

IN NAPTR 100 10 "u" "sip+E2U" "!^.*$!sip:Mary.Smith@sip.cosmote.gr!" .

IN NAPTR 100 11 "u" "mms+E2U" "!^.*$!mms:+306971234567/TYPE=PLMN@mms.cosmote.gr!" .

IN NAPTR 101 10 "u" "mailto+E2U" "!^.*$!mailto:Mary.Smith@mycosmos.gr!" .

IN NAPTR 102 10 "u" "mailto+E2U" "!^.*$!mailto:MaryS@otenet.gr!" .

The +306971234567 is converted to the following URIs:

sip:Mary.Smith@sip.cosmote.gr

mms:+306971234567/TYPE=PLMN@mms.cosmote.gr

mailto:Mary.Smith@mycosmos.gr

mailto:MaryS@otenet.gr

9. In case that the ENUM-DNS returns more than one MMS URI, the originator MMS Relay/Server shall sort the MMS URIs according to the Order and Preference fields as it is described in [57] and [58].

10. The originator MMS Relay/Server shall resolve the domain part of the “mailbox” of the highest precedence MMS URI to an IP address using standard DNS.

EXAMPLE: The highest precedence MMS URI is mms:+306971234567/TYPE=PLMN@mms.cosmote.gr

The domain part of the “mailbox” is mms.cosmote.gr and is resolved (e.g. DNS) to 10.10.0.1

11. The resulting IP address together with the recipient RFC 2822 address (“mailbox”) shall be used by the originator MMS Relay/Server for routing forward the MM using the protocol described in clause 6.8 to the recipient MMS Relay/Server.

MMS Resource Record (RR)

The key fields in the NAPTR RR are the Domain, TTL, Class, Type, Order, Preference, Flags, Service, Regexp and Replacement and they are described in [57] and [58]. In particular, for this release the following fields are further specified as follows:

Service = "mms+E2U"

Regexp = "!^.*$!mms:mailbox!" where “mailbox” token and its associated formatting rules are specified in [5].

The MMS URI is of the form “mms:mailbox”

Annex G (normative): Recipient MSISDN address resolution based on IMSI.

Only if recipient addressing resolution mechanism based on a MAP query is used, the procedures defined in this annex shall be followed.

For those recipients MSISDN addresses that appear in an MM and belong to an external MMSE, the originator MMS Relay/Server shall translate (resolve) them to a routable RFC 2822 [5] address that shall be used in the "RCPT TO" SMTP subsequent commands.

Recipient MSISDN address resolution procedure:

1. The originator MMS Relay/Server determines that the recipient MSISDN address belongs to an external MMSE.

2. The originator MMS Relay/Server shall interrogate the recipient HLR for the associated IMSI by invoking a standard GSM-MAP operations SRI_for_SM or/and Send_IMSI as described in [59] and [61]. When SRI_for_SM operation is used the SM-RP-PRI parameter should be set to 'true'.

3. In case of a successful interrogation the originator MMS Relay/Server shall determine the MCC and MNC and look up for a matching entry in an IMSI table. The IMSI table shall maintain the associations of MCC + MNC → MMSE FQDN. Subsequently the originator MMS Relay/Server shall be able to resolve (e.g. using standard DNS) the MMSE FQDN to an IP address for establishing the SMTP (MM4) session.

4. If the recipient MSISDN is not known to belong to any MMSE (No entry in the IMSI table, GSM-MAP error, etc.), the MMS Relay/Server shall invoke an appropriate address resolution exception handling procedure. These procedures are not standardized.

NOTE: Although the used GSM-MAP operations are standardized operations, in some cases HLR is unable to return the correct recipient's IMSI number (GSM MAP error received) due to e.g. recipient's settings or recipient network's settings. In that case MMS Relay/Server shall invoke an appropriate exception handling procedure. These procedures are not standardized.

The above procedure complies with the Mobile Number Portability (MNP) requirements and technical realization as they are specified in [60] and [61] respectively. In addition, this procedure complies with the Non-call related signalling MNP procedures for direct and indirect routeing as it is described in [61], Annex B.

Figure F.1 provides an example message flow diagram:

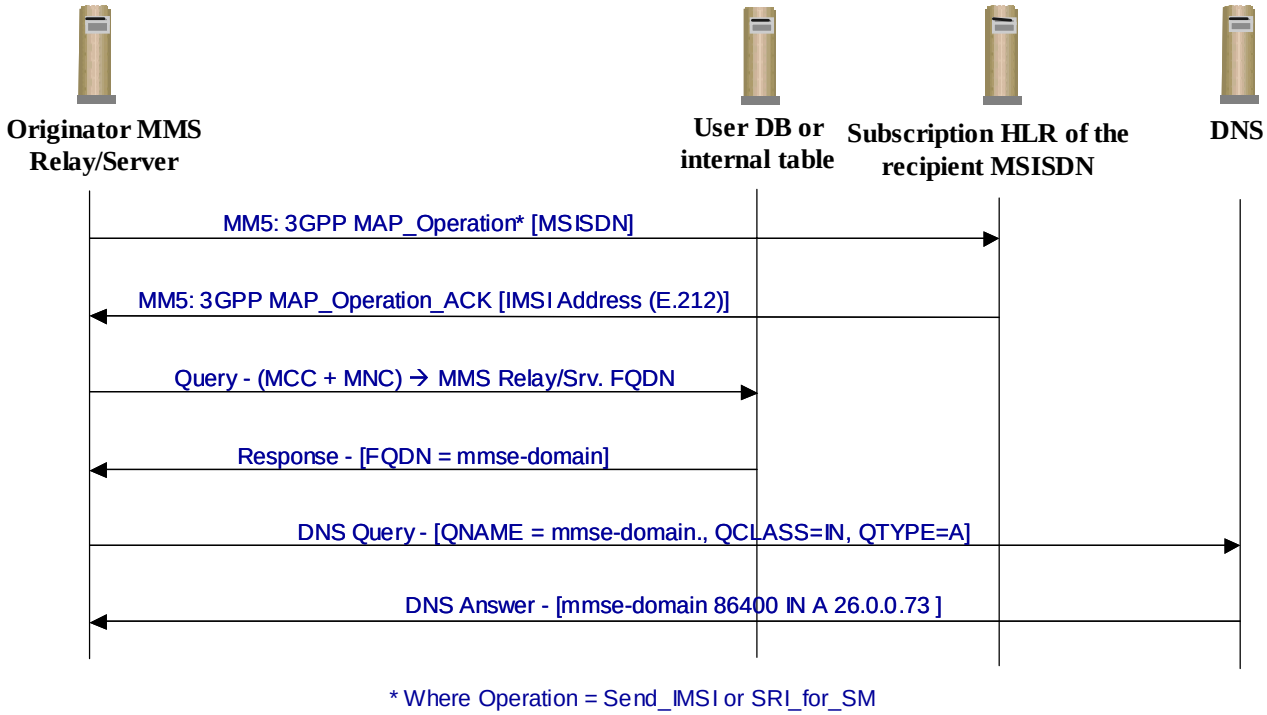

Figure F.1: Message flow of the recipient MSISDN address resolution based on IMSI.

Annex HF (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
15/03/00	T#7	TP-000028			New	2.0.0	3.0.0
					Editorial change by MCC	3.0.0	3.0.1
22/09/00	T#9	TP-000144	001		Set of mandatory media formats for MMS	3.0.1	4.0.0
08/12/00	T#10	TP-000195	002		High-level description of MMS	4.0.0	4.1.0
15/03/01	T#11	TP-010029	003		High-level description of MMS - part II	4.1.0	4.2.0
14/06/01	T#12	TP-010128	004		Corrections on MM4 example	4.2.0	4.3.0
14/06/01	T#12	TP-010128	005		MMS Media Codec/Format – Corrections, Clarifications and Updates	4.2.0	4.3.0
14/06/01	T#12	TP-010128	006		Address Hiding and Read-Reply Report	4.2.0	4.3.0
14/06/01	T#12	TP-010128	007		Correction of MMSE definition	4.2.0	4.3.0
21/09/01	T#13	TP-010194	008		Clarification of REL-4 MMS authentication	4.3.0	4.4.0
21/09/01	T#13	TP-010194	009		MMS address hiding	4.3.0	4.4.0
21/09/01	T#13	TP-010194	013		Correction to MMS MM4 interface	4.3.0	4.4.0
21/09/01	T#13	TP-010194	015		Refinement of the reply-charging service behaviour description	4.3.0	4.4.0
21/09/01	T#13	TP-010194	016		Correction to MMS MM4 interface, delivery report	4.3.0	4.4.0
21/09/01	T#13	TP-010194	010		New Figure 5: Interworking with different MMSEs	4.4.0	5.0.0
21/09/01	T#13	TP-010194	011		Priority field in notification message	4.4.0	5.0.0
21/09/01	T#13	TP-010194	012		Detailed Notification	4.4.0	5.0.0
21/09/01	T#13	TP-010194	014		Editorial changes	4.4.0	5.0.0
21/09/01	T#13	TP-010194	017		Clarifications and Editorial Changes	4.4.0	5.0.0
14/12/01	T#14	TP-010280	019		Reference to TS 29.061 specification on RADIUS usage	5.0.0	5.1.0
14/12/01	T#14	TP-010280	020		Clarification of the reply-charging service behaviour description	5.0.0	5.1.0
14/12/01	T#14	TP-010280	023		Clarification of Forwarding in MM1 message retrieval	5.0.0	5.1.0
14/12/01	T#14	TP-010280	025		Removing inconsistency of mandated functionality	5.0.0	5.1.0
14/12/01	T#14	TP-010280	026		Correction of MM Status Code	5.0.0	5.1.0
14/12/01	T#14	TP-010280	028		Correction on MM1 and MM4 abstract messages	5.0.0	5.1.0
14/12/01	T#14	TP-010280	030		clarification of status codes in MM4_read_reply_report.REQ	5.0.0	5.1.0
14/12/01	T#14	TP-010280	031		Configuration of MMS-capable UEs	5.0.0	5.1.0
14/12/01	T#14	TP-010280	032		MMS address hiding	5.0.0	5.1.0
14/12/01	T#14	TP-010280	033		reply-charging clarifications	5.0.0	5.1.0

3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020162

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **049** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☒ Radio Access Network ☐ Core Network ☐

Title:	⌘	Terminal Capability Negotiation
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	18.01.2002
Category:	⌘	**B**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	Terminal capability negotiation is an important part of the MMS framework which – although already specified in the WAP implementations of MMS R'99 and MMS REL-4 - was not yet adequately reflected in 23.140.
Summary of change:	⌘	Describes the functional behaviour and realisation of terminal capability negotiation in MMS
Consequences if not approved:	⌘	Terminal capability negotiation which is already specified in the WAP implementations of MMS R'99 and MMS REL-4 will still not be adequately reflected in 23.140 for REL-5.

Clauses affected:	⌘	5.1.1, 5.2, 7.1.3, 8.1.3
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5 Functional Description of Involved MMS Elements

5.1 MMS User Agent

5.1.1 MMS User Agent operations

The MMS User Agent shall provide the following application layer functionalities:-

- the retrieval of MMs (initiate MM delivery to the MMS User Agent).
- terminal capability negotiation.

The MMS User Agent may provide additional application layer functionalities such as:-

- the MM composition
- the MM submission
- the MM presentation;
- the presentation of notifications to the user;
- the signing of an MM on an end-user to end-user basis;
- the decryption and encryption of an MM on an end-user to end-user basis;
- all aspects of storing MMs on the terminal;
- the handling of external devices;
- the user profile management.

This optional list of additional functionalities of the MMS User Agent is not exhaustive.

5.1.2 Minimum set of supported formats

…

5.2 MMS Relay/Server

The MMS Relay/Server is responsible for storage and notification, reports, and general handling of messages. The MMS Relay/Server may also provide convergence functionality between External Servers and MMS User Agents and thus enable the integration of different server types across different networks. An Example can be found in Annex A.

It is possible to separate the MMS Relay/Server element into MMS Relay and MMS Server elements, but an allocation of the MMS Relay/Server functionalities to such elements is not defined in this release.

The MMS Relay/Server is responsible for the following functions:-

- receiving and sending MM;
- enabling/disabling MMS function;
- personalising MMS based on user profile information;
- MM deletion based on user profile or filtering information;
- media type conversion;
- media format conversion;
- conversion of messages arriving at the recipient MMS Relay/Server from legacy messaging systems to MM format (e.g. facsimile to MM)

- conversion of MMs leaving the originator MMS Relay/Server to legacy messaging systems to the appropriate message format (e.g. MM to internet email)
- message content retrieval;
- MM forwarding;
- screening of MM;
- negotiation of terminal capabilities;
- checking terminal availability;
- MM notification to the MMS User Agent;
- generating delivery reports;
- routing forward MMs and read-reply reports;
- generating call data records (CDR);
- address translation.
- address hiding
- managing the message properties on servers (e.g. voicemail or email server) integrated in the MMSE (consistency)
- temporary and/or persistent storage of messages
- ensuring that messages are not lost until successfully delivered to another MMSE element
- controlling the reply-charging feature of MMS

5.3 External Servers

…

7 MMS Service Behaviour Description

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7.1.3 Retrieval of a Multimedia Message in the recipient MMSE

The recipient MMS User Agent shall be able to request delivery of an MM from the recipient MMS Relay/Server based on the information received in the notification.

Upon delivery request the recipient MMS Relay/Server

- shall deliver the MM to the recipient MMS User Agent
- may perform data adaptation based on user profile and/or MMS User Agent capabilities
- shall not provide the MM originator address to the MM recipient if the originator MMS User Agent requested its address to be hidden from the MM recipient
- shall provide the MM originator address to the MM recipient if the originator MMS User Agent did not request its address to be hidden from the MM recipient and if the MM originator address is available at the recipient MMS Relay/Server
- may provide an alias or clarifying text (e.g. “anonymous address” or “unknown address”) in the originator address field instead of providing the originator address to the recipient MMS User Agent, if the originator has requested address hiding or the original message does not contain the originator address
- shall give an indication to the recipient MMS User Agent that a delivery report is requested if such a delivery report has been requested by the originator MMS User Agent

- shall give an indication to the recipient MMS User Agent that a read-reply report is requested if such a read reply report has been requested by the originator MMS User Agent
- shall indicate the MIME content type of the MM to the recipient MMS User Agent
- shall provide other available message qualifications unaltered to the recipient MMS User Agent
- shall provide the time stamp of the MM unaltered to the recipient MMS User Agent
- shall be responsible for the storage of messages in the network until the recipient MMS User Agent becomes reachable (e.g. user moves back into coverage, switches MMS User Agent on) or until the MM expires.
- should provide the recipient MMS User Agent with a list of addresses of forwarding MMS User Agents for the MM if the MM was forwarded and the address information is available to the recipient MMS Relay/Server.

In a response to an MM's delivery the recipient MMS User Agent may be able to

- request a delivery report not to be generated by the MMS Relay/Server.

7.1.3.1 Terminal Capability Negotiation

An MMS User Agent shall support Terminal Capability Negotiation. An MMS Relay/Server should support Terminal Capability Negotiation.

Within a request for delivery of an MM the recipient MMS User Agent shall be able to indicate its capabilities towards the recipient MMS Relay/Server.

The recipient MMS User Agent may indicate its capabilities towards the recipient MMS Relay/Server by transmitting:

- a set of information describing the terminal's capabilities
- a link (e.g. URI) to a database where the MMS Relay/Server can fetch a set of information describing the terminal's capabilities, and/or
- a differential set of information indicating changes to a previously indicated set of terminal capability information.

The detailed definition of the specific mechanism for terminal capability negotiation shall be defined by the MM1 implementation (WAP etc.). The mechanism for terminal capability negotiation shall ensure that the MMS Relay/Server is provided with the information describing the MMS User Agent's capabilities within every request for delivery of an MM.

E.g. in the WAP implementation of MMS, in case an underlying WSP session is established between the MMS User Agent and an intermediate WAP Gateway, the MMS User Agent indicates its capabilities towards the WAP Gateway only after the initial set-up of the underlying WSP session or spontaneously following a change in terminal capabilities. The WAP Gateway, however, caches the terminal capability information and passes these on to the MMS Relay/Server within every request for delivery of an MM. Intermediate proxies on the MM1 reference point may also be involved in terminal capability negotiation and/or content adaptation.

Upon reception of such a delivery request the recipient MMS Relay/Server should use the information about the capabilities of the recipient MMS User Agent in preparation of MMs to be delivered to the recipient MMS User Agent. The MMS Relay/Server should adjust an MM to be delivered that contains media types and media formats that are not supported by the recipient MMS User Agent. This adjustment might involve the deletion or adaptation of those unsupported media types and media formats.

The MMS User Agent's capability information should include

- the maximum supported size of an MM,
- the maximum supported resolution of an image,
- a list of supported media types and media formats (e.g. MIME types),
- a list of supported character sets,
- a list of preferred languages,

- the maximum supported colour depth,
- an indication whether or not the recipient MMS User Agent supports streaming for the retrieval of MM contents as specified in clause 7.1.7.

This information may include additional information related to the MMS implementation (WAP etc.).

7.1.4 Forwarding of a Multimedia Message without prior Retrieval

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3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020161

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **048** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Adding a reference to 3GPP TS 32.235
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	25.01.2002
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	SA5 specifies CDRs for MMS in 3GPP TS 32.235, but there is no reference to 3GPP TS 32.235 in 3GPP TS 23.140 yet.
Summary of change:	⌘	A reference to 3GPP TS 32.235 was added.
Consequences if not approved:	⌘	It wouldn't be clear from 3GPP TS 23.140 in which specification the definition of CDRs for MMS are defined which might result in implementations not being compliant with 3GPP TS 32.235

Clauses affected:	⌘	2, 4.2, Annex C
Other specs Affected:	⌘	☒ Other core specifications ⌘ 3GPP TS 32.235 ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	This is a resubmission of T2M020113 from SWG3#10

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

2 References

• • •

[55] WAP-183-ProvCont, Provisioning Content, URL: http://www.wapforum.org

[56] WAP-209-MMSEncapsulation, MMS Encapsulation Protocol, URL: http://www.wapforum.org

[57] 3GPP TS 32.235: "Charging Management; Charging Data Description for Application Services".

• • •

4 General Architecture

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4.2 Involved MMS Elements

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MMS Relay/Server

The MMS Relay/Server is responsible for storage and handling of incoming and outgoing messages and for the transfer of messages between different messaging systems. Depending on the business model, the MMS Relay/Server may be a single logical element or may be separated into MMS Relay and MMS Server elements. These may be distributed across different domains.

The MMS Relay/Server should be able to generate charging data (Call Data Record - CDR) when receiving MMs from or when delivering MMs to another element of the MMSNA according to 3GPP TS 32.235 [57].

MMS User Databases

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Annex C (informative): Call Data Records

This annex describes information of MMs/abstract messages which may be required for inclusion into Call Data Records (CDR's) for MMS for the purpose of Billing and Traceability. Further details on the CDR content and transport for MMS are described in the 3GPP TS 32.235 [57].

This list of information elements is not complete but includes:

- MMS-specific message-ID
- Recipient address(es)
- Sender address
- Message size (sent/received)
- Identification if a message has been sent to a pre-defined group
- Time stamp (including timezone): for submission time, earliest delivery time and time of expiry

- Duration of transmission (e.g. for streaming purposes)
- Duration of storage (in the MMS server)
- Type of message: (e.g. notification, message MM, delivery report, read-reply)
- Bearer type used
- Content information(e.g. audio, picture, video, text,)
- Message class (e.g. advertisement/informational)
- Delivery Report Request
- Read Reply Request
- Charging Indicator (e.g. Pre paid charging, Reply charging, Reverse charging, Third party financed)
- MM Status (e.g. delivered, abandoned, time expired, delivery pending).
- Indication of forwarding

This information shall be time-stamped.

The following information elements at least will be considered for the future.

- A specific class/type for MMS used for the Instant Messaging functionality
- Conversion of type and media
- Security level used
- Priority/QoS

Annex D (informative): MM3 principles

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3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020158

CR-Form-v3

CHANGE REQUEST

⌘ **23.140** **CR** **047** ⌘ rev **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☒ Radio Access Network ☐ Core Network ☐

Title:	⌘	Submission Description Enhancement regarding the IE “Date and Time”
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	11.01.2002
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	So far the service behaviour description of the submission of an MM does not mandate the originator MMS Relay/Server to send an information element “Date and time” within the MM to the either the recipient MMS Relay/Server or recipient MMS Client although the Information Element “Date and Time” is mandatory in the MM1_retrive.RES and the MM4_forward.REQ abstract messages.
Summary of change:	⌘	An existing requirement of the service behaviour description of the submission of a Multimedia Message is aligned with the description of the technical realisation.
Consequences if not approved:	⌘	The service description is not completely inline with the description of the technical realisation.

Clauses affected:	⌘	7.1.1
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
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1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

7 MMS Service Behaviour Description

7.1 MMS services offered

7.1.1 Submission of a Multimedia Message in the originator MMSE

When a user intends to send an MM to one or several destinations the MM shall be submitted to the originator MMS Relay/Server.

The support for submission of MMs is optional for MMS User Agents. The support for submission of MMs is mandatory for MMS Relay/Servers.

If an MMS User Agent supports submission of MMs the MMS User Agent shall be able to:

- Indicate the address of the MM recipient
- Identify the MIME content type of the message.

If a MMS User Agent supports submission of MMs the MMS User Agent may be able to:

- Request a delivery report for the message
- Request a read-reply report for the message
- Provide a time stamp for the time of submission of the message
- Set the earliest desired time of delivery for the message
- Set the desired time of expiry for the message
- Indicate the address of the MM originator
- Set further message qualifications (e.g. priority, message class, subject)
- Request the MM originator's address being hidden from the recipient MMS User Agent.

Upon reception of an MM from an originator MMS User Agent the originator MMS Relay/Server

- shall assign a Message Identification to the MM and immediately provide the originator MMS User Agent with this Message Identification
- is responsible for retaining the MM until the earliest desired time of delivery, if the optional feature of earliest time of delivery is supported by the originator MMS Relay/Server. If this feature is not supported then the MM is immediately routed forward.
- ~~may~~ shall provide the peer entity with a time stamp if not provided by the originator MMS User Agent. ~~, i.e.~~ ~~it~~The originator MMS Relay/Server may also override the MMS User Agent's time stamp ,
- shall insert the originator's address into the MM if not ~~yet~~ provided by the originator MMS User Agent
- shall pass the originator's address to the peer entity if the peer entity is known to be a MMS Relay/Server

- shall route forward the request for address hiding unaltered to the recipient MMS Relay/Server if the peer entity is known to be an MMS Relay/Server .
- shall pass the originator's address to the peer entity if the peer entity is not known to be an MMS Relay/Server and address hiding has not been requested by the originator MMS User Agent
- shall not pass the originator's address to the peer entity and should override the address provided by the originator MMS User Agent in the MM to an "anonymous" address if the peer entity is not known to be an MMS Relay/Server and address hiding has been requested by the originator MMS User Agent
- may override the address provided by the originator MMS User Agent in the MM (subject to MMS service provider's preferences)
- is responsible for resolving the MM recipient's address(es),
- is responsible to route the MM towards the MM recipients.
- should pass the indication whether or not a delivery report is requested unaltered when routing the MM towards the MM recipient(s)
- shall pass the indication whether or not a read-reply report is requested unaltered when routing the MM towards the MM recipient(s)
- shall pass the indication about MIME content type of the message and message qualifications (e.g. priority, message class, subject) unaltered when routing the MM towards the MM recipient(s)
- shall generate a delivery report indicating "indeterminate" status of the MM's delivery if a delivery report was requested by the originator MMS User Agent and if the peer entity the MM is routed forward to is not known by the originator MMS Relay/Server.

A special case is where the recipient MMS Relay/Server is also the originator MMS Relay/Server. In this case the MM does not have to be routed forward.

7.1.2 Reception of a Multimedia Message in the recipient MMSE

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3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020157

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **046** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☒ Radio Access Network ☐ Core Network ☐

Title:	⌘	Detection of duplicate MMs
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	22 January 2002
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	There is currently no standard method of detecting MMs that have been previously successfully submitted that are re-submitted by an MMS User Agent. The MMS User Agent may re-submit an MM because it falsely believes the original submission failed because it did not receive a positive acknowledgement from the MMS Relay/Server. (The reason it may not receive the acknowledgment may be because of delays in the network or temporary out of coverage etc.). Since MMs may be billed per submission an originator MMS User Agent may be billed twice (or more) for the submission of a single MM. In addition, since the MMs may also be billed on retrieval a recipient MMS User Agent may also be billed twice (or more) for the multiple copies of the same MM. This CR provides the functionality for stage 3 implementations to solve this problem.
Summary of change:	⌘	Addition of the service offered to include the detection of duplicate MMs on the MM1 interface.
Consequences if not approved:	⌘	Stage 3 definitions of the MM1 reference point may not implement functionality to detect duplicate MMs. Therefore the MMSE may not be capable of detecting duplicate MMs and originators and recipients may be billed more than once for the same MM.

Clauses affected:	⌘	7.1.1, 8.1
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

7 MMS Service Behaviour Description

7.1 MMS services offered

7.1.1 Submission of a Multimedia Message in the originator MMSE

When a user intends to send an MM to one or several destinations the MM shall be submitted to the originator MMS Relay/Server.
The support for submission of MMs is optional for MMS User Agents. The support for submission of MMs is mandatory for MMS Relay/Servers.
If an MMS User Agent supports submission of MMs the MMS User Agent shall be able to:

- Indicate the address of the MM recipient
- Identify the MIME content type of the message.

If a MMS User Agent supports submission of MMs the MMS User Agent may be able to:

- Request a delivery report for the message
- Request a read-reply report for the message
- Provide a time stamp for the time of submission of the message
- Set the earliest desired time of delivery for the message
- Set the desired time of expiry for the message
- Indicate the address of the MM originator
- Set further message qualifications (e.g. priority, message class, subject)
- Request the MM originator's address being hidden from the recipient MMS User Agent.

Upon reception of an MM from an originator MMS User Agent the originator MMS Relay/Server

- shall assign a Message Identification to the MM and immediately provide the originator MMS User Agent with this Message Identification
- is responsible for retaining the MM until the earliest desired time of delivery, if the optional feature of earliest time of delivery is supported by the originator MMS Relay/Server. If this feature is not supported then the MM is immediately routed forward.
- may provide a time stamp, i.e. it may also override the MMS User Agent's time stamp,
- shall insert the originator's address into the MM if not yet provided by the originator MMS User Agent
- shall pass the originator's address to the peer entity if the peer entity is known to be a MMS Relay/Server
- shall route forward the request for address hiding unaltered to the recipient MMS Relay/Server if the peer entity is known to be an MMS Relay/Server .
- shall pass the originator's address to the peer entity if the peer entity is not known to be an MMS Relay/Server and address hiding has not been requested by the originator MMS User Agent
- shall not pass the originator's address to the peer entity and should override the address provided by the originator MMS User Agent in the MM to an "anonymous" address if the peer entity is not known to be an MMS Relay/Server and address hiding has been requested by the originator MMS User Agent
- may override the address provided by the originator MMS User Agent in the MM (subject to MMS service provider's preferences)
- is responsible for resolving the MM recipient's address(es),
- is responsible to route the MM towards the MM recipients.
- should pass the indication whether or not a delivery report is requested unaltered when routing the MM towards the MM recipient(s)
- shall pass the indication whether or not a read-reply report is requested unaltered when routing the MM towards the MM recipient(s)
- shall pass the indication about MIME content type of the message and message qualifications (e.g. priority, message class, subject) unaltered when routing the MM towards the MM recipient(s)
- shall generate a delivery report indicating "indeterminate" status of the MM's delivery if a delivery report was requested by the originator MMS User Agent and if the peer entity the MM is routed forward to is not known by the originator MMS Relay/Server.
- may reject the MM submission if the MM is identified as a duplicate of an MM already stored.

A special case is where the recipient MMS Relay/Server is also the originator MMS Relay/Server. In this case the MM does not have to be routed forward.
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8.1 Technical realisation of MMS on reference point MM1

On the MM1 reference point an underlying authentication mechanism should be available.
The network-provided MMS User Agent's ID (e.g. MSISDN or IMSI) should be made available to the MMS Relay/Server by the RADIUS mechanisms defined in [54]. This ID should be used to authenticate the MMS User Agent.

8.1.x Detection of Duplicate MMs

On the MM1 reference point an underlying mechanism for detecting the submission of duplicate MMs should be available.

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3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020156

CR-Form-v3

CHANGE REQUEST

⌘ **23.140** **CR** **045** ⌘ rev **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network **X**

Title:	⌘	Correction of the Forwarding Feature
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	January 22th 2002
Category:	⌘	**A**
Release:	⌘	REL-5

Use one of the following categories:
- ***F*** *(essential correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(Addition of feature),*
- ***C*** *(Functional modification of feature)*
- ***D*** *(Editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	Implementations of the MM1 interface have highlighted that there is an essential need for clarification of the forwarding information on the MM1 interface for message retrieval. It is unclear which addressing and date/time information is contained on both the MM1 and MM4 interfaces when a message has been forwarded.
Summary of change:	⌘	The Usage of the Date and Time Information Elements and the Sender Address IE are clarified for the message forwarding use case. To ensure backwards compatibility the Sender Address and the Date and Time IE shall contain the appropriate information that is related to the last handling of the MM by an MMS User Agent, i.e. either submission or forwarding of the MM. Additionally an forwarded MM may contain the address(es) of the MMS User Agent(s) that previously handled the MM. The Information Element “Forwarded-by” is renamed to “Previously-sent-by” to better match the changed meaning of the field. The behaviour of the MMS Relay/Server is described for the case when sender anonymity has been requested upon submission of the MM that is forwarded.
Consequences if not approved:	⌘	Incompatible implementations of the MM1_retrieve.RES and MM4_forward.REQ abstract messages.

Clauses affected:	⌘	7.1.4, 7.1.9, 8.1.2.3, 8.1.2.4, 8.1.3.3, 8.1.3.4, 8.4.1.3, 8.4.1.4, 8.4.4.2, 8.4.4.8
Other specs Affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

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7 MMS Service Behaviour Description

7.1 MMS services offered

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7.1.4 Forwarding of a Multimedia Message without prior Retrieval

This part of the MMS service describes the mechanism by which an MMS User Agent may request the corresponding MMS Relay/Server, that an MM for which the MMS User Agent is the intended recipient (and is notified of the MM) be forwarded to other specified recipient(s) MMS User Agent(s) whose address(es) shall be specified by the forwarding MMS User Agent, without having to first retrieve the MM.

The support for originating a request that a specific MM be forwarded is optional for the MMS User Agent.

The support for forwarding an MM, in response to a request from a MMS User Agent that a specific MM be forwarded is optional for the MMS Relay/Server.

The original MM is forwarded to a new recipient(s) with the forwarding MMS User Agent's address being provided but without additional content, and without affecting the elements of the original MM. Some additional information elements e.g. delivery report, read-reply report, i.e. requests for reports which are to provide feedback on the forwarded MM to the forwarding MMS User Agent, may be supplied.

MM Element Forwarding, where particular elements of an MM are requested to be forwarded, is left for standardisation in future releases.

~~If a forwarding MMS User Agent supports~~ Upon requesting an MM to be forwarded~~ing~~ the MMS User Agent ~~shall~~:

- shall indicate the address of the MM recipient(s),
- shall provide the message reference provided in the MM Notification,
- shall not request address hiding,
- shall not generate a read-reply report to the originator MMS User Agent even if a read-reply report is requested.

~~If a MMS User Agent supports requesting forwarding of MMs the forwarding MMS User Agent may:~~

- may ~~I~~indicate the address of the ~~F~~forwarding MMS User Agent (i.e. it's own address),
- may ~~P~~provide a time stamp for the time of submission of the request to forward the MM,
- may ~~S~~set the desired time of expiry for the forwarded MM,
- may ~~S~~set the earliest desired time of delivery for the forwarded MM,
- may ~~R~~request a delivery report for the forwarded MM,
- may ~~R~~request a read-reply report for the forwarded MM.

Upon reception of a request from a forwarding MMS User Agent to forward an MM, the forwarding MMS Relay/Server

- shall assign a Message Identification to the forwarded MM and immediately provide the forwarding MMS User Agent with this Message Identification,
- shall provide status information on the MM forward request to the forwarding MMS User Agent,

- is responsible for retaining the forwarded MM until the earliest desired time of delivery, if the optional feature of earliest time of delivery is supported by the MMS Relay/Server of the forwarding MMS User Agent. If this feature is not supported then the MM is immediately routed forward,
- may provide a time stamp of the MM submission,
- shall not provide the MM originator's address if the originator MMS User Agent requested its address to be hidden from the MM recipient(s),
- shall not route forward the request for address hiding of the MM originator,
- shall provide the address of the MMS User Agent that requested forwarding of the MM,
- ~~may~~ shall provide a time stamp for the request to forward~~ed~~ the MM~~, i.e~~. ~~i~~It may also override the forwarding MMS User Agent's time stamp,
- shall insert the forwarding MMS User Agent's address into the forwarded MM if not yet provided,
- may override the address provided by the forward~~ed~~ing request~~MM~~ (subject to MMS service provider's preferences),
- is responsible for resolving the recipient's address(es) of the forwarded MM,
- is responsible to route the forwarded MM towards the MM recipient(s),
- shall pass the indication whether or not a delivery report is requested unaltered when routing the forwarded MM towards the MM recipient(s),
- shall pass the indication whether or not a read-reply report is requested unaltered when routing the forwarded MM towards the MM recipient(s),
- shall generate a delivery report indicating "indeterminate" status of the MM's delivery if a delivery report was requested by the ~~forwarding~~last MMS User Agent that handled the message and if the peer entity the MM is routed forward to is not known to the MMS Relay/Server of the forwarding MMS User Agent,
- shall provide the recipient~~(s)~~ MMS Relay/Server(s) with a count of the number of times that the particular MM was forwarded,
- shall provide the recipient~~(s)~~ MMS Relay/Server(s) with a list of addresses of forwarding MMS User Agents for the MM,
- shall generate a delivery report to the originator MMS User Agent if a delivery report is requested.

A special case is where the recipient MMS Relay/Server is also the forwarding MMS Relay/Server. In this case the MM does not have to be routed forward.

7.1.5 Delivery Report

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7.1.9 Address Hiding in MMS

An originator MMS User Agent may support a request for the sender's address to be hidden from the recipient(s). An MMSE may support such a request, i.e., it may allow address hiding. In any case, a recipient MMSE shall ensure that a sender's address is hidden from the recipient MMS User Agent when address hiding is requested for an MM.

If the originator's MMS Relay/Server does not allow address hiding (anonymous messages) (e.g. legislation does not permit anonymous messages) a message containing a request for address hiding shall be rejected upon submission and the originator's MMS Relay/Server shall return an error information to the originator MMS User Agent.

In the case of originator's MMS Relay/Server rejects the message because it does not allow address hiding the rejection information shall be delivered in a submit response together with optional status text.

In case the recipient MMS Relay/Server rejects the message because it does not allow address hiding and the originator MMS User Agent has requested a delivery report, then the recipient MMS Relay/Server shall inform the originator of the message rejection within the delivery report.

In case the recipient MMS Relay/Server rejects the message because it does not allow address hiding and the originator MMS User Agent has not requested a delivery report, then the originator MMS Relay/Server may inform the MM originator by generating a new MM which is sent back to the MM originator.

Independent of whether or not the originator's address is shown or hidden to the recipient, the originator may be able to ask for a delivery report to an MM and also receive the delivery report according to the normal behaviour of the MMS framework.

If the originator MMS User Agent has requested both its address to be hidden and a read-reply report the originator MMS User Agent might not receive the read-reply report.

If the recipient forwards the MM outside the MMSE and the peer entity is unknown to the forwarding MMS Relay/Server the recipient MMS Relay/Server shall not transfer the originator's address but replace it with either appropriate coded address or leave the originator address field blank.

In case of forwarding an MM without prior retrieval the forwarding MMS User Agent shall not request her address to be hidden.

7.1.10 Support for Reply-Charging in MMS

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8 MMS Application Protocol Framework and Technical Realisation of MMS Service Features

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8.1.2 Multimedia Message Notification

This part of the MMS service covers the notification about MM from the recipient MMS Relay/Server to the corresponding recipient MMS User Agent and involving abstract messages are outlined in Table 4 from type, and direction points of view.

Table 4: abstract messages for notification of MM in MMS

Abstract message	Type	Direction
MM1_notification.REQ	Request	MMS Relay/Server -> MMS UA
MM1_notification.RES	Response	MMS UA -> MMS Relay/Server

8.1.2.1 Normal Operation

Upon receiving the MM1_notification.REQ, the recipient MMS User Agent shall respond with the MM1_notification.RES to the recipient MMS Relay/Server to acknowledge the successful reception of the MM1_notification.REQ.

The MM1_notification.RES shall unambiguously refer to the corresponding MM1_notification.REQ.

8.1.2.2 Abnormal Operation

In this case the MMS UA shall respond with a MM1_notification.RES encapsulating a status which indicates the reason the notification could not be processed. If the MMS UA does not provide the MM1_notification.RES the MMS Relay/Server should be able to retransmit the notification at a later state.

8.1.2.3 Features

Addressing: The MM originator address may be provided to the recipient MMS User Agent in the MM1_notification.REQ. The MM originator address shall not be provided to the recipient MMS User Agent if the MM originator has requested her address to be hidden from the MM recipient. In the case of forwarding, the address of the latest forwarding MMS User Agent shall be provided.

Time constraints: The recipient MMS User Agent shall be provided a time of expiry of the MM. In case of reply-charging the deadline for the latest time of submission of a reply-MM should be conveyed within the MM1_notification.REQ.

Reply-Charging: In case of reply-charging the MMS Relay/Server may indicate in the MM1_notification.REQ that a reply to the notified original MM is free of charge and the reply-charging limitations.

Message class, message size, priority and subject: The MM shall be qualified further by adding a message class and an approximate size to the MM in the MM1_notification.REQ. The MM may be qualified further by adding a priority and/or subject to the MM. Additional qualifiers may be added.

Reporting: If the originator MMS User Agent has requested to have a delivery report, the recipient MMS Relay/Server may convey this information to the recipient MMS User Agent in the MM1_notification.REQ. The recipient MMS User Agent may indicate in the MM1_notification.RES that it would not wish a delivery report to be created.

Identification: In case of reply-charging when a reply-MM is notified within the MM1_notification.REQ the MMS Relay/Server should convey the identification of the original MM replied to within the same MM1_notification.REQ.

Message Reference: The recipient MMS Relay/Server shall always provide a reference, e.g., URI, for the MM in the MM1_notification.REQ.

MM Status: The recipient MMS User Agent may indicate in the MM1_notification.RES how it intends the MM to be handled, e.g. the immediate rejection of the MM.

MM element descriptor: The recipient MMS Relay/Server may provide one or more description(s) of message elements in the MM1_notification.REQ. A description shall contain a reference to the message element, e.g. a URI, an index number etc.. A description of a message element may be further qualified by adding one or more of such parameters as:

- name of the message element
- type and format of the message element
- approximate size of the message element

8.1.2.4 Information Elements

Table 5: Information elements in the MM1_notification.REQ.

Information element	Presence	Description
Message class	Mandatory	The class of the MM (e.g., personal, advertisement, information service; default = personal)
Message size	Mandatory	The approximate size of the MM
Time of expiry	Mandatory	The time of expiry for the MM.
Message Reference	Mandatory	a reference, e.g., URI, for the MM
Subject	Optional	The title of the whole MM.
Priority	Optional	The priority (importance) of the message.
Sender address	~~Optional~~Conditional	~~The address of the MM originator.~~ The address of the MMS User Agent that most recently handled the MM, i.e. that either submitted or forwarded the MM. If the originator MMS User Agent has requested her address to be hidden from the recipient her address shall not be provided to the recipient.
Delivery report	Optional	Request for delivery report
Reply-Charging	Optional	Information that a reply to this particular original MM is free of charge.
Reply-Deadline	Optional	In case of reply-charging the latest time of submission of a reply granted to the recipient.
Reply-Charging-Size	Optional	In case of reply-charging the maximum size of a reply-MM

		granted to the recipient.
Reply-Charging-ID	Optional	The identification of the original MM replied to if this notification indicates a reply-MM.
Element-Descriptor	Optional	The reference for an element of the MM, which may contain further information about the referenced element of the MM, e.g. the name, the size and/or the type and format of the message element

Table 6: Information elements in the MM1_notification.RES.

Information element	Presence	Description
MM Status	Optional	The status of the MM's retrieval
Report allowed	Optional	Request to allow or disallow the sending of a delivery report to the MM originator

8.1.3 Retrieval of Multimedia Message

This part of MMS service covers the retrieval of an MM. For retrieval purposes an MM shall always be retrieved by the recipient MMS User Agent from the recipient MMS Relay/Server. Involved abstract messages are outlined in Table 7 from type and direction points of view.

Table 7: Abstract messages for retrieval of MM in MMS

Abstract messages	Type	Direction
MM1_retrieve.REQ	Request	MMS UA -> MMS Relay/Server
MM1_retrieve.RES	Response	MMS Relay/Server -> MMS UA
MM1_acknowledgement.REQ	Request	MMS UA -> MMS Relay/Server

8.1.3.1 Normal Operation

The recipient MMS User Agent shall issue an MM1_retrieve.REQ to the recipient MMS Relay/Server to initiate the retrieval process. The MMS Relay/Server shall respond with an MM1_retrieve.RES, which contains MMs control information and the MM content.

After receiving the MM1_retrieve.RES, the recipient MMS User Agent shall send an MM1_acknowledgement.REQ to the corresponding MMS Relay/Server, if requested by the MMS Relay/Server. The MM1_acknowledgement.REQ shall unambiguously refer to the corresponding MM1_retrieve.RES.

8.1.3.2 Abnormal Operation

If the recipient MMS Relay/Server can not process the MM1_retrieve.REQ, for example due to invalid content location or expiration of the message, the recipient MMS Relay/Server shall respond with either an MM1_retrieve.RES or a lower protocol layer error message encapsulating a status which indicates the reason to the MMS User Agent the multimedia message was not delivered.

If the MMS Relay/Server does not provide the MM1_retrieve.RES or the lower protocol layer error message the MMS User Agent should be able to recover.

8.1.3.3 Features

Message Reference: The recipient MMS User Agent shall provide a reference, e.g., URI, for the MM in the MM1_retrieve.REQ.

Addressing: The MM originator address may be provided to the recipient MMS User Agent in the addressing-relevant information field of MM1_retrieve.RES. The MM originator address shall not be provided to the recipient MMS User Agent if the MM originator has requested her address to be hidden from the MM recipient. In the case of forwarding, the address of the latest forwarding MMS User agent shall be provided and the address(es) of the previous forwarding MMS User Agent(s) and the address of the originator MMS User Agent may be provided. One or several address(es) of the

MM recipient(s) may be provided to the recipient MMS User Agent in the addressing-relevant information field(s) of the MM1_retrieve.RES.

Time stamping: The MM1_retrieve.RES shall carry the time and date of the most recent handling of the MM by an MMS User Agent (i.e. either submission or the most recent forwarding of the MM). In the case of forwarding, the MM1_retrieve.RES may in addition carry the time and date of the submission of the MM.~~of submission of the MM or the time and date of the forwarding of the MM~~.

Time constraints: In case of reply-charging the deadline for the latest time of submission of a reply-MM shall be conveyed within the MM1_retrieve.RES.

Message class, priority and subject: Information about class, priority, subject of the MM shall be included in the MM1_retrieve.RES according to their presence and value received at the MMS Relay/Server. Information about additional end-to-end qualifiers of the MM should be included in the MM1_retrieve.RES according to their presence and value received at the MMS Relay/Server.

Reporting: If the originator MMS User Agent has requested to have a read-reply report, the recipient MMS Relay/Server shall convey this information in the MM1_retrieve.RES. If the originator MMS User Agent has requested to have a delivery report, the recipient MMS Relay/Server may convey this information to the recipient MMS User Agent in the MM1_retrieve.RES. If a request for a delivery report is included in the MM1_retrieve.RES the recipient MMS User Agent shall convey the information whether it accepts or denies the sending of a delivery report to the MM originator in MM1_acknowledgement.REQ. If a delivery report is not requested, it is up to the recipient MMS User Agent to include this information in MM1_acknowledgement.REQ or not.

Reply-Charging: In case of reply-charging the MMS Relay/Server should indicate in the MM1_retrieve.RES that a reply to this particular original MM is free of charge and the reply-charging limitations.

Identification: The MMS Relay/Server shall provide a message identification for a message, which it has accepted for delivery in the MM1_retrieve.RES. In case of reply-charging the MMS Relay/Server shall provide the message-ID of the original MM which is replied to in the MM1_retrieve.RES.

Content Type: The type of the MM's content shall always be identified in the MM1_retrieve.RES.

Content: The content of the multimedia message if added by the originator MMS User Agent of the MM may be conveyed in the MM1_retrieve.RES.

Status: In case of normal operation the recipient MMS Relay/Server may indicate in the MM1_retrieve.RES that the retrieval of the MM was processed correctly. In case of abnormal operation the recipient MMS Relay/Server shall indicate in the MM1_retrieve.RES the reason why the multimedia message could not be retrieved. The corresponding reason codes should cover application level errors (e.g. "the media format could not be converted", "insufficient credit for retrieval"). Lower layer errors may be handled by corresponding protocols.

Status Text: The status text is optional, and may be returned to provide explanatory text corresponding to the Status code.

~~**Forwarded_by:** The address of the forwarding MMS User Agent. Multiple addresses are possible. In the multiple address case this is a sequential list of the address(es) of the forwarding MMS User Agents who forwarded the same MM.~~

Previously-sent-by: The address(es) of the MMS User Agent(s) that submitted or forwarded the MM prior to the last forwarding MMS User Agent. In the multiple forwarding case the order of the provided addresses shall be indicated and the address of the originator MMS User Agent shall be indicated, if present.

Note: The address of the last forwarding MMS User Agent is carried in other addressing elements.

8.1.3.4 Information Elements

Table 8: Information elements in the MM1_retrieve.REQ

Information element	Presence	Description
Message Reference	Mandatory	Location of the content of the MM to be retrieved.

Table 9: Information elements in the MM1_retrieve.RES

Information element	Presence	Description
Message ID	Mandatory	The message ID of the MM.
Sender address	Conditional	The address of the MMS User Agent that most recently handled the MM, i.e. that either submitted or forwarded the MM. If the originator MMS User Agent has requested her address to be hidden from the recipient her address shall not be provided to the recipient.~~The address of the originator of MM unless the originator MMS User Agent has requested her address to be hidden from the MM recipient.~~
Content type	Mandatory	The content type of the MM's content.
Recipient address	Optional	The address of the MM recipient. Multiple addresses are possible.
Message class	Optional	The class of the message (e.g., personal, advertisement, information service)
Date and time	Mandatory	The time and date of the most recent handling (i.e. either submission or forwarding) of the MM by an MMS User Agent.~~submission of the MM or the time and date of the forwarding of the MM (time stamp)~~
Delivery report	Optional	A request for delivery report.
Priority	Conditional	The priority (importance) of the message if specified by the originator MMS User Agent..
Read reply	Conditional	A request for read-reply report if the originator MMS User Agent of the MM has requested a read-reply report.
Subject	Conditional	The title of the whole multimedia message if specified by the originator MMS User Agent of the MM.
Status	Optional	The status of the MM retrieve request.
Status Text	Optional	Description which qualifies the status of the MM retrieve request.
Reply-Charging	Optional	Information that a reply to this particular original MM is free of charge.
Reply-Charging-ID	Optional	In case of reply-charging this is the identification of the original MM replied to.
Reply-Deadline	Optional	In case of reply-charging the latest time of submission of a reply granted to the recipient.
Reply-Charging-Size	Optional	In case of reply-charging the maximum size of a reply-MM granted to the recipient.
Previously-sent-by~~Forwarded_by~~	Optional~~Conditional~~	In case of forwarding this information element contains one or more address(es) of MMS User Agent(s) that handled (i.e. forwarded or submitted) the MM prior to the MMS User Agent whose address is contained in the Sender address information element. The order of the addresses provided shall be marked. The address of the originator MMS User Agent shall be marked, if present.~~The address of the forwarding MMS User Agent. Multiple addresses are possible. In the multiple address case this is a Sequential list of the address(es) of the forwarding MMS User Agents who forwarded the same MM.~~
Previously-sent-date-and-time	Optional	The date(s) and time(s) associated with submission and forwarding event(s) prior to the last handling of the MM by an MMS User Agent.
Content	Conditional	The content of the multimedia message if specified by the originator MMS User Agent of the MM.

Table 10: Information elements in the MM1_acknowledgement.REQ

Information element	Presence	Description
Report allowed	Optional	Request to allow or disallow the sending of a delivery report to the MM originator

8.1.4 Forwarding of Multimedia Message

This part of the MMS service describes the mechanism by which a forwarding MMS User Agent can request from the corresponding MMS Relay/Server, that an MM for which the MMS User Agent is the intended recipient (and has been notified of the MM) be forwarded to other specified recipient(s) MMS User Agent(s) whose address(es) shall be specified by the forwarding MMS User Agent, without having to first retrieve the MM.

For forwarding purposes an MM forward request shall always be requested by the forwarding MMS User Agent of the forwarding MMS Relay/Server. Involved abstract messages are outlined in Table 11 from type and direction points of view.

Table 11: Abstract messages for forwarding of MM without prior retrieval

Abstract messages	Type	Direction
MM1_forward.REQ	Request	MMS UA -> MMS Relay/Server
MM1_forward.RES	Response	MMS Relay/Server -> MMS UA

8.1.4.1 Normal operation

The forwarding MMS User Agent shall issue an MM1_forward.REQ to the forwarding MMS Relay/Server, which contains MMS control information. The MMS Relay/Server shall respond with an MM1_forward.RES, which provides the status of the request. The MM1_forward.RES shall unambiguously refer to the corresponding MM1_forward.REQ. Support for MM1_forward.REQ is optional for the MMS User Agent. Support for MM1_forward.RES is optional for the MMS Relay/Server.

8.1.4.2 Abnormal Operation

In this case the MMS Relay/Server shall respond with an MM1_forward.RES encapsulating a status which indicates the reason the request for forwarding was not accepted, e.g. no subscription, service not available, invalid content location, message expired.

If the MMS Relay/Server does not provide the MM1_forward.RES the MMS User Agent should be able to recover.

8.1.4.3 Features

Addressing: One or several recipients of an MM forward request shall be indicated in the addressing-relevant information field(s) of the MM1_forward.REQ. The forwarding MMS User Agent may be indicated in addressing-relevant information field(s) of the MM1_forward.REQ.

Time stamping: The forwarding MMS User Agent may time stamp the MM.

Time constraints: The forwarding MMS User Agent may request an earliest desired time of delivery of the MM. The forwarding MMS User Agent may request a time of expiry for the MM.

Reporting: The forwarding MMS User Agent may request a delivery report for the MM. In addition, the forwarding MMS User Agent may request a read-reply report when the user has viewed the MM.

Identification: The MMS Relay/Server of the forwarding MMS User Agent shall always provide a message identification for an MM forward request, which it has accepted for being forwarded in the MM1_forward.RES.

Message Reference: The forwarding MMS User Agent shall always provide the reference, e.g., URI, for the MM in the MM1_forward.REQ which was provided in MM1_notification.REQ.

Status: The MMS Relay/Server of the forwarding MMS User Agent shall indicate the status of the MM1_forward.REQ in the MM1_forward.RES. The reason code given in the status information element of the MM1_forward.RES may be supported with an explanatory text further qualifying the status. If this text is available in the status text information element the MMS User Agent should bring it to the user's attention. The choice of the language used in the status text information element is at the discretion of the MMS service provider.

8.1.4.4 Information Elements

Table 12: Information elements in the MM1_forward.REQ.

Information element	Presence	Description
Recipient address	Mandatory	The address of the recipient of the forwarded MM. Multiple addresses are possible.
Forwarding address	Optional	The address of the forwarding MMS User Agent.
Date and time	Optional	The time and date of the forwarding of the MM.
Time of Expiry	Optional	The desired time of expiry for the forwarded MM.
Earliest delivery time	Optional	The earliest desired time of delivery of the MM to the recipient.
Delivery report	Optional	A request for delivery report for the forwarded MM.
Read reply	Optional	A request for read reply report.
Message Reference	Mandatory	A reference, e.g., URI, for the MM

Table 13: Information elements in the MM1_forward.RES.

Information element	Presence	Description
Status	Mandatory	The status of the MM Forward request.
Status Text	Optional	Description which qualifies the status of the MM Forward request.
Message ID	Mandatory	The identification of the MM given to an accepted MM.

8.1.5 Delivery Report

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8.4 Technical realisation of MMS on reference point MM4

An MMSE may be able to discover a peer MMSE. This clause defines the interworking between MMS Relay/Servers once the peer systems are aware of each other being an MMSE.

Future releases may elaborate how peer MMSEs discover each other. In the mean time, it is expected that MMS service providers or network operators will develop solutions for their particular needs which may include static tables or other look-up methods.

8.4.1 Routing Forward of a Multimedia Message

This part of MMS service covers the routing forward of an MM from an originator MMS Relay/Server to a recipient MMS Relay/Server of different MMSEs. Involved abstract messages are outlined in Table 19 from type and direction points of view.

Table 19: Abstract messages for forwarding of MM in MMS

Abstract messages	Type	Direction
MM4_forward.REQ	Request	Originator MMS Relay/Server -> recipient MMS Relay/Server
MM4_forward.RES	Response	Recipient MMS Relay/Server -> originator MMS Relay/Server

8.4.1.1 Normal operation

After successful discovery of its peer entity the originator MMS Relay/Server shall route an MM forward to the recipient MMS Relay/Server using the MM4_forward.REQ, which contains MMS control information and the MM content. The recipient MMS Relay/Server shall respond with a MM4_forward.RES, which provides the status of the request if an MM4_forward.RES was requested.

Support for MM4_forward.REQ and MM4_forward.RES is mandatory for the MMS Relay/Server.

8.4.1.2 Abnormal Operation

In this case the recipient MMS Relay/Server shall respond with a MM4_forward.RES, which includes a status that indicates the reason the multimedia message was not accepted, e.g. no subscription, bad address, network not reachable, etc., if an MM4_forward.RES was requested.

8.4.1.3 Features

Addressing: The recipient(s) of a routed forward MM shall be indicated in the addressing-relevant information field(s) of the MM4_forward.REQ. If the addresses of several MM recipients of the MM are associated with a single MMS Relay/Server then more than one MM recipient may be indicated in the addressing-relevant information field(s) of the MM4_forward.REQ. Addresses of all MM recipients of the MM (including those that are not associated with the MMS Relay/Server the MM is forwarded to) shall be conveyed in the MM4_forward.REQ for the MM recipient's informational purposes.

The MM originator of a routed forward MM shall be indicated in addressing-relevant information field(s) of the MM4_forward.REQ. If the originator MMS User Agent requested to hide its identity from the MM recipient then the information about this request shall also be conveyed in the MM4_forward.REQ.

Time stamping: The MM4_forward.REQ shall carry the date and time ~~stamp associated with the MM.~~ of the most recent handling of the MM by an MMS User Agent (i.e. either submission or forwarding of the MM). In the case of forwarding the MM4_forward.REQ may carry the date and time of the submission of the MM

Time constraints: If the originator MMS User Agent requested a time of expiry for the MM then this information shall be conveyed in the MM4_forward.REQ.

Message class, priority and subject: If the MM is qualified further by message class, priority, subject and/or additional qualifiers then this information shall be conveyed in the MM4_forward.REQ.

Reporting: If the originator MMS User Agent requested a delivery report for the MM then the information about this request shall be conveyed in the MM4_forward.REQ. If, in addition, the originator MMS User Agent requested a read-reply report then the information about this request shall be conveyed in the MM4_forward.REQ.

Identification: The originator MMS Relay/Server shall always provide a unique message identification for an MM, which it routed forward to a peer MMS Relay/Server in the MM4_forward.REQ.

Content Type: The type of the multimedia content shall always be identified in the MM4_forward.REQ.

Acknowledgement Request: The originator MMS Relay/Server may request a MM4_forward.RES from the recipient MMS Relay/Server acknowledging the successful reception of the MM.

Request Status: The recipient MMS Relay/Server shall indicate the status of the MM4_forward.REQ in the associated MM4_forward.RES if requested.

Message Type: The type of message used on reference point MM4 indicating MM4_forward.REQ and MM4_forward.RES as such.

Transaction Identification: If the originator MMS Relay/Server requests an MM4_forward.RES from the recipient MMS Relay/Server it shall provide a transaction identification within an MM4_forward.REQ. The MM4_forward.RES shall unambiguously refer to the corresponding MM4_forward.REQ using the same transaction identification.

Forward_Counter: A Counter indicating the number of times the particular MM was forwarded.

~~**Forwarded_by:** The address of the forwarding MMS User Agent. Multiple addresses are possible. In the multiple address case this is a Sequential list of the address(es) of the forwarding MMS User Agents who forwarded the same MM.~~

Previously-sent-by: The address(es) of the MMS User Agent(s) that submitted or forwarded the MM prior to the last forwarding MMS User Agent. In the multiple forwarding case the order of the provided addresses shall be indicated and the address of the originator MMS User Agent shall be marked, if present.

Note: The address of the last forwarding MMS User Agent is carried in other addressing elements.

Version: The MMS protocol shall provide unique means to identify the current version in the particular protocol environment.

8.4.1.4 Information Elements

Table 20: Information elements in the MM4_forward.REQ.

Information element	Presence	Description
3GPP MMS Version	Mandatory	The MMS version of the originator MMS Relay/Server as defined by the present document.
Message Type	Mandatory	The type of message used on reference point MM4: "MM4_forward.REQ".
Transaction ID	Mandatory	The identification of the MM4_forward.REQ/ MM4_forward.RES pair.
Message ID	Mandatory	The identification of the MM.
Recipient(s) address	Mandatory	The address(es) of the MM recipient(s). Multiple addresses are possible.
Sender address	Mandatory	The address of the MMS User Agent that most recently handled the MM, i.e. that either submitted or forwarded the MM. If the originator MMS User Agent has requested her address to be hidden from the recipient her address shall not be provided to the recipient.~~The address of the MM originator.~~
Content type	Mandatory	The content type of the MM's content.
Message class	Conditional	The class of the MM (e.g., personal, advertisement, information service) if specified by the originator MMS User Agent
Date and time	Mandatory	The time and date of the most recent handling (i.e. either submission or forwarding) of the MM by an MMS User Agent.~~submission of the Mm (time stamp) or the time and date of the forwarding of the MM..~~
Time of Expiry	Conditional	The desired time of expiry for the MM if specified by the originator MMS User Agent.
Delivery report	Conditional	A request for delivery report if the originator MMS User Agent has requested a delivery report for the MM.
Priority	Conditional	The priority (importance) of the message if specified by the originator MMS User Agent.
Sender visibility	Conditional	A request to show or hide the sender's identity when the message is delivered to the MM recipient if the originator MMS User Agent has requested her address to be hidden from the recipient.
Read reply	Conditional	A request for read reply report if the originator MMS User Agent has requested a read-reply report for the MM..
Subject	Conditional	The title of the whole MM if specified by the originator MMS User Agent.
Acknowledgement Request	Optional	Request for MM4_forward.RES
Forward_counter	Conditional	A counter indicating the number of times the particular MM was forwarded.
Previously-sent-by~~Forwarded_by~~	Optional~~Conditional~~	In case of forwarding this information element contains one or more address(es) of MMS User Agent(s) that handled (i.e. forwarded or submitted) the MM prior to the MMS User Agent whose address is contained in the Sender address information element. The order of the addresses provided shall be marked. The address of the originator MMS User Agent shall be marked, if present.~~The address of the forwarding MMS User Agent. Multiple addresses are possible. In the multiple address case this is a Sequential list of the address(es) of the forwarding MMS User Agents who forwarded the same MM.~~
Previously-sent-date-and-time	Optional	The date(s) and time(s) associated with submission and forwarding event(s) prior to the last handling of the MM by an MMS User Agent.
Content	Conditional	The unaltered content of the multimedia message if specified by the originator MMS User Agent.

Table 21: Information elements in the MM4_forward.RES.

Information element	Presence	Description
3GPP MMS Version	Mandatory	The MMS version of the recipient MMS Relay/Server as defined by the present document.
Message Type	Mandatory	The type of message used on reference point MM4: “MM4_forward.RES”.
Transaction ID	Mandatory	The identification of the MM4_forward.REQ/ MM4_forward.RES pair.
Message ID	Mandatory	The Message ID of the MM which has been forwarded within the corresponding MM4_forward.REQ
Request Status Code	Mandatory	The status of the request to route forward the MM.
Status text	Optional	Status text corresponding to the code

8.4.2 Routing Forward of a Delivery Report

…

8.4.4 Message format on MM4

All elements of an MM shall be included within a single SMTP "mail" message which shall be organised as MIME type application/multipart. All MM elements shall be of standard MIME content types. In addition to the MM elements this SMTP "mail" message should reflect all MMS information elements according to the definitions in clauses 6 and 8.4.

All other MMS-related messages, such as delivery reports, read-reply reports, transfer acknowledgements shall each be transferred as a single SMTP "mail" message which shall be organised as MIME type text/plain. This SMTP "mail" message should reflect all MMS information elements as defined above.

8.4.4.1 Message header fields

MMS information elements should be reflected as "header fields" according to STD 11 in the SMTP "mail" message. See RFC 1327 [53] for a detailed description of the X.400 header to STD 11 headers mappings. Some of the mappings are context dependent.

For those information elements that cannot be mapped to standard STD 11 "header fields" the "X-" extensions mechanism shall be used with an "X-MMS-" prefix.

The mapping of information elements to commonly used (RFC 1327) [53] or standard STD 11 "header fields" is shown in following tables.

8.4.4.2 MM4_Forward.REQ Header Mappings

The MM4 Forward request header mappings are detailed below.

Table 28: MM4_Forward.REQ Information Elements to STD 11 Header Mappings

Information element	STD 11 Headers
3GPP MMS Version	X-Mms-3GPP-MMS-Version:
Message Type	X-Mms-Message-Type:
Transaction ID	X-Mms-Transaction-ID:
Message ID	X-Mms-Message-ID:
Recipient(s) address	To:, CC:
Sender address	From:
Content type	Content-Type:
Message class	X-Mms-Message-Class:
Date and time	Date:
Time of Expiry	X-Mms-Expiry:
Delivery report	X-Mms-Delivery-Report:
Priority	X-Mms-Priority:
Sender visibility	X-Mms-Sender-Visibility:
Read reply	X-Mms-Read-Reply:
Subject	Subject:
Acknowledgement Request	X-Mms-Ack-Request:
Forward counter	X-Mms-Forward-Counter:
Previously-sent-by	X-Mms-Previously-sent-by:
Previously-sent-date and-time	X-Mms-Previously-sent-date-and-time:
Content	*<message body>*
-	Sender:
-	X-Mms-Originator-System:
-	Message-ID:

The table above indicates the mappings from MM4_Forward.REQ information elements to the corresponding STD 11 headers.

The MM Message-ID is not directly mapped to a corresponding STD 11 [5] "Message-ID:" header. Each STD 11 message must have a unique message id, which is carried in the "Message-ID:" header.

Content-type maps directly since both are defined as being MIME content types as specified in RFC 2046 [6].

The STD 11 "From:" header is determined by the mail user agent, or, in this case, the MMS User Agent. This corresponds to the MM "Sender address", as set by the MMS User Agent or MMS Relay/Server.

STD 11 messages are required to have a Sender: header that indicates the originator address (as determined by the SMTP "MAIL From" command).

The STD 11 “X-Mms-Originator-System:” header shall be used to indicate the address that the recipient MMS Relay/Server shall use as the recipient address with MM4_Forward.RES.

8.4.4.3 MM4_Forward.RES Header Mappings

The MM4 Forward response information element mappings are detailed in the table below.

The transmission of the Forward Response from the recipient MMS Relay/Server requires a properly addressed STD 11 message. While the addressing of the MM4_Forward.REQ is clearly that of the intended recipients and originator, the MM4_Forward.RES addressing is related to neither the recipients nor the originator of the original MM. Instead, the MM4_Forward.RES addressing is based on special systems addresses. MMS Service Provider should configure appropriate system addresses which will be used as both the recipient and originator of these administrative messages. It is suggested that the administrative addressing be based on the pattern:

system-user@mms-relay-host.mmse-domain.

The STD 11 “To:” header value shall be according to the STD 11 “X-Mms-Originator-System:” header value provided in MM4_Forward.REQ.

Table 29: MM4_Forward.RES Information Elements to STD 11 Header Mappings

Information element	STD 11 Header
3GPP MMS Version	X-Mms-3GPP-MMS-Version:
Message Type	X-Mms-Message-Type:
Transaction ID	X-Mms-Transaction-ID:
Message ID	X-Mms-Message-ID:
Request Status Code	X-Mms-Request-Status-Code:
Status text	X-Mms-Status-Text:
-	Sender:
-	To:
-	Message-ID:
-	Date:

The Sender: and To: headers contain system addresses as described above, and do not map to MM4_Forward.RES information elements. The STD 11 message requires a Date: header, but there currently is no corresponding MM4_Forward.RES information element.

8.4.4.4 MM4_Delivery_report.REQ Header Mappings

The mappings of the MM4_Delivery_report.REQ information elements to STD 11 headers is detailed in the table below.

Table 30: MM4_Delivery_report.REQ Information Elements to STD 11 Header Mappings

Information element	STD 11 Header
3GPP MMS Version	X-Mms-3GPP-MMS-Version:
Message Type	X-Mms-Message-Type:
Transaction ID	X-Mms-Transaction-ID:
MM Message ID	X-Mms-Message-ID:
Recipient address	From:
Sender address	To:
MM Date and time	Date:
Acknowledgement Request	X-Mms-Ack-Request:
MM Status Code	X-Mms-MM-Status-Code:
Status Text	X-Mms-Status-text:
-	Sender:
-	Message-ID:

The meaning of Recipient address is that of the original MM, from whose MMS User Agent this Delivery-report is being generated. The meaning of Sender address is that of the original MM, to whom the Delivery-report is being sent.

The value of the STD 11 Sender: header is a system administration address, to which the corresponding response will be sent.

The Sender: header value is automatically set to the system address of the MMS Relay/Server.

The Message-ID: value is automatically generated by the MMS Relay/Server, in conformance to STD 11 [5].

The other header mappings from information elements are similar to those already described above.

8.4.4.5 MM4_Delivery_report.RES Header Mappings

The mappings of the M4_Delivery_report.RES information elements to STD 11 headers is detailed in the table below.

Table 31: MM4_Delivery_report.RES Information Elements to STD 11 Header Mappings

Information element	STD 11 Header
3GPP MMS Version	X-Mms-3GPP-MMS-Version:
MM Message Type	X-Mms-Message-Type:
Transaction ID	X-Mms-Transaction-ID:
Message ID	X-Mms-Message-ID:
Request Status Code	X-Mms-Request-Status-Code:
Status text	X-Mms-Status-Text:
-	Sender:
-	To:
-	Message-ID:
-	Date:

The Sender: header value is automatically set to the system address of the MMS Relay/Server that is replying to the MM4_Delivery_report.REQ.

The To: header value of the MM4_Delivery_report.RES abstract message is obtained from the Sender: header value of the corresponding MM4_Delivery_report.REQ.

The Date and Message-ID headers, which have no corresponding MM4_Forward.RES information attributes, are automatically provided values by the MMS Relay/Server.

8.4.4.6 MM4_Read_reply_report.REQ Header Mappings

The mappings of the MM4_Read_reply_report.REQ information elements to STD 11 headers is detailed in the table below.

Table 32: MM4_Read_reply_report.REQ Information Elements to STD 11 Header Mappings

Information element	STD 11 Header
3GPP MMS Version	X-Mms-3GPP-MMS-Version:
Message Type	X-Mms-Message-Type:
Transaction ID	X-Mms-Transaction-ID:
Recipient address	From:
Sender address	To:
Message-ID	X-Mms-Message-ID:
Date and time	Date:
Acknowledgement Request	X-Mms-Ack-Request:
Read Status	X-Mms-Read-Status:
Status text	X-Mms-Status-Text:
-	Sender:
-	Message-ID:
-	Date:

The meaning of Recipient address is that of the original MM, from whose MMS User Agent this Read-reply-report is being generated. The meaning of Sender address is that of the original MM, to whom the Read-reply-report is being sent.

The value of the Sender: header is a system address, to which the corresponding MM4_Read_reply_report.RES shall be sent.

The Message-ID:, and Date: headers, which have no corresponding information attribute in the MM4_Read_reply_report.REQ, are automatically provided appropriate values by the MMS Relay/Server.

8.4.4.7 MM4_Read_reply_report.RES Header Mappings

The mappings of the MM4_Read_reply_report.RES information elements to STD 11 headers is detailed in the table below.

Table 33: MM4_Read_reply_report.RES Information Elements to STD 11 Header Mappings

Information element	STD 11 Header
3GPP MMS Version	X-Mms-3GPP-MMS-Version:
MM Message Type	X-Mms-Message-Type:
Transaction ID	X-Mms-Transaction-ID:
Request Status Code	X-Mms-Request-Status-Code:
Status text	X-Mms-Status-Text:
-	Sender:
-	To:
-	Message-ID:
-	Date:

The Sender: header value shall be the system address of the MMS Relay/Server that is replying to the MM4_Delivery_report.REQ.

The To: header value of the MM4_Delivery_report.RES abstract message shall be obtained from the corresponding MM4_Delivery_report.REQ Sender: header value.

The Date: and Message-ID: headers, which do not have corresponding information elements, shall be provided appropriate values automatically by the MMS Server/Relay.

8.4.4.8 Header Field Value Range

MMS information elements that are mapped to standard STD 11 "header fields", i.e. which do not have an "X-MmsMS-" prefix, should be used according to [5].

The rest of the header definitions used in this clause, including the mechanisms and pre-defined tokens, are described in an augmented Backus-Naur Form (BNF) defined in [48], similar to that used by RFC 822 [5]. Implementers will need to be familiar with the notation in order to understand these definitions.

For the residual MMS information elements the following applies:

X-Mms-3GPP-MMS-Version:

```
3GPP-MMS-Version = "X-Mms-3GPP-MMS-Version" ":"  1*DIGIT "." 1*DIGIT "."
1*DIGIT
```

Note that the numbers MUST be treated as separate integers and that each may be incremented higher than a single digit. Thus, 2.1.4 is a lower version than 2.1.13, which in turn is lower than 2.3.0 Leading zeros shall be ignored by recipient MMS Relay/Server and shall NOT be sent. The version is according to the version of the present document (see also clause "Foreword").

X-Mms-Message-Type:

```
Message-type = "X-Mms-Message-Type" ":" ( "MM4_forward.REQ" |
"MM4_forward.RES" | "MM4_delivery_report.REQ" | "MM4_delivery_report.RES" |
"MM4_read_reply_report.REQ" | "MM4_read_reply_report.RES" )
```

X-Mms-Transaction-Id:

```
Transaction-id =  "X-Mms-Transaction-ID" ":" quoted-string
```

X-Mms-Message-Id:

```
Message-id =  "X-Mms-Message-ID" ":" quoted-string
```

X-Mms-Message-Class:

```
Message-class = "X-Mms-Message-Class" ":" ( Class-identifier | quoted-string
)

Class-identifier = "Personal" | "Advertisement" | "Informational" | "Auto"
```

X-Mms-Expiry:

```
Expiry-value = "X-Mms-Expiry" ":" ( HTTP-date | delta-seconds )
```

X-Mms-Delivery-Report:

```
Delivery-report =  "X-Mms-Delivery-Report" ":" ( "Yes" | "No" )
```

X-Mms-Priority:

```
Priority = "X-Mms-Priority" ":" ( "Low" | "Normal" | "High" )
```

X-Mms-Sender-Visibility:

```
Sender-visibility = "X-Mms-Sender-Visibility" ":" ( "Hide" | "Show" )
```

X-Mms-Read-Reply:

```
Read-reply = "X-Mms-Read-Reply" ":" ( "Yes" | "No" )
```

X-Mms-Ack-Request:

```
Ack-Request = "X-Mms-Ack-Request" ":" ( "Yes" | "No" )
```

X-Mms-Request-Status-Code:

```
Request-status-Code =  "X-Mms-Request-Status-Code" ":" ( "Ok" | "Error-
unspecified" | "Error-service-denied" | "Error-message-format-corrupt" |
"Error-sending-address-unresolved" | "Error-message-not-found" | "Error-
network-problem" |   "Error-content-not-accepted" | "Error-unsupported-
message" )
```

X-Mms-MM-Status-Code:

```
MM-Status-Code = "X-Mms-MM-Status-Code" ":" ( "Expired" | "Retrieved" |
"Rejected" | "Deferred" | "Indeterminate" | "Forwarded" | "Unrecognised" )
```

X-Mms-Read-Status:

```
Read-Status = “X-Mms-Read-Status” “:” ( “Read” | “Deleted without being read” )
```

X-Mms-Forward-Counter

```
Forward-Counter = "X-Mms-Forward-Counter" ":" 1*DIGIT
```

X-Mms-Previously-sent-by

```
Previously-sent-by = “X-Mms-Previously-sent-by” “:” 1*DIGIT “,” mailbox
```

The address should be machine-usable, as defined by "mailbox" in RFC 2822 [5].

Note: The number indicates the chronological order of the submission and forwarding event(s). The number “0” is associated with the submission of the MM. A higher number indicates an event at a later point in time.

X-Mms-Previously-sent-date-and-time

```
Previously-sent-date-and-time = “X-Mms-Previously-sent-date-and-time” “:”
1*DIGIT “,” HTTP-date
```

The date should be machine-usable, as defined by "HTTP-date" in RFC 2616 [48].

Note: The number indicates the chronological order of the submission and forwarding events. The number “0” is associated with the submission of the MM. The number indicates the correspondence to the MMS User Agent’s address in the “X-Mms-Previously-sent-by” header field with the same number.

8.4.4.9 Message Encoding on MM4

The SMTP "mail" message shall be encoded according to STD 11 [5].^

. . .

3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020155

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **044** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☒ Radio Access Network ☐ Core Network ☒

Title:	⌘	Correction of addressing on MM1_Submit.REQ
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	January 21st, 2002
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	Currently recipient address description in MM1_Submit.REQ is inconsistent with other parts of specifications. It states that recipient address should be MMS User Agent address.
Summary of change:	⌘	The sentence “The address of recipient MMS User Agent” is changed to “The address of the recipient(s) of MM(s)”
Consequences if not approved:	⌘	Inconsistancy specification

Clauses affected:	⌘	8.1.1.4
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.1 Technical realisation of MMS on reference point MM1

On the MM1 reference point an underlying authentication mechanism should be available.

The network-provided MMS User Agent's ID (e.g. MSISDN or IMSI) should be made available to the MMS Relay/Server by the RADIUS mechanisms defined in [54]. This ID should be used to authenticate the MMS User Agent.

8.1.1 Submission of Multimedia Message

This part of MMS service covers the submission of an MM. For sending purposes a terminal-originated MM shall always be submitted from the originator MMS User Agent to the corresponding MMS Relay/Server. Involved abstract messages are outlined in Table 1 from type and direction points of view.

Table 1: Abstract messages for submission of MM in MMS

Abstract messages	Type	Direction
MM1_submit.REQ	Request	MMS UA -> MMS Relay/Server
MM1_submit.RES	Response	MMS Relay/Server -> MMS UA

8.1.1.1 Normal operation

The originator MMS User Agent shall submit a terminal-originated MM to the originator MMS Relay/Server using the MM1_submit.REQ, which contains MMS control information and the MM content. The MMS Relay/Server shall respond with an MM1_submit.RES, which provides the status of the request. The MM1_submit.RES shall unambiguously refer to the corresponding MM1_submit.REQ.

Support for MM1_submit.REQ is optional for the MMS UA, support for MM1_submit.RES is mandatory for the MMS Relay/Server.

8.1.1.2 Abnormal Operation

In this case the originator MMS Relay/Server shall respond with a MM1_submit.RES encapsulating a status which indicates the reason the multimedia message was not accepted, e.g. no subscription, corrupt message structure, service not available.

If the MMS Relay/Server does not provide the MM1_submit.RES the MMS User Agent should be able to recover.

8.1.1.3 Features

Addressing: One or several MM recipients of a submitted MM shall be indicated in the addressing-relevant information field(s) of the MM1_submit.REQ. The originator of a submitted MM may be indicated in addressing-relevant information field(s) of the MM1_submit.REQ. The originator MMS User Agent may request to hide its identity from the MM recipient.

Time stamping: The originator MMS User Agent may time stamp the MM.

Time constraints: The originator MMS User Agent may also request an earliest desired time of delivery of the MM. The originator MMS User Agent may request a time of expiry for the MM. In case of reply-charging the originator MMS User Agent may also request a deadline for the latest time of submission of reply-MMs granted to the recipient(s).

Reply-Charging: The originator MMS User Agent may indicate that the sender wants to pay for a reply-MM and convey the reply-charging limitations (e.g. the latest time of submission and/or the maximum size of a reply-MM) in the MM1_submit.REQ.

Message class, priority and subject: The MM may be qualified further by adding a message class, priority and/or subject to the MM in the MM1_submit.REQ. Additional qualifiers may be added.

Reporting: The originator MMS User Agent may request a delivery report for the MM. In addition, the originator MMS User Agent may request a read-reply report when the user has viewed the MM.

Identification: The originator MMS Relay/Server shall always provide a message identification for an MM, which it has accepted for submission in the MM1_submit.RES. In case of reply-charging the MMS User Agent which submits a reply-MM (i.e. the MMS User Agent that received the original MM) shall provide the message-ID of the original MM which it replies to in the MM1_submit.REQ.

Content Type: The MIME type of the multimedia content shall always be identified in the MM1_submit.REQ.

Content: The originator MMS User Agent may add content in the MM1_submit.REQ.

Request Status: The originator MMS Relay/Server shall indicate the status of the MM1_submit.REQ in the associated MM1_submit.RES. The reason code given in the status information element of the MM1_submit.RES may be supported with an explanatory text further qualifying the status. If this text is available in the status text information element the MMS User Agent should bring it to the user's attention. The choice of the language used in the status text information element is at the discretion of the MMS service provider.

8.1.1.4 Information Elements

Table 2: Information elements in the MM1_submit.REQ.

Information element	Presence	Description
Recipient address	Mandatory	The address of the recipient(s) of the MM~~S User Agent~~. Multiple addresses are possible.
Content type	Mandatory	The content type of the MM's content.
Sender address	Optional	The address of the MM originator.
Message class	Optional	The class of the MM (e.g., personal, advertisement, information service)
Date and time	Optional	The time and date of the submission of the MM (time stamp).
Time of Expiry	Optional	The desired time of expiry for the MM or reply-MM.
Earliest delivery time	Optional	The earliest desired time of delivery of the MM to the recipient.
Delivery report	Optional	A request for delivery report.
Reply-Charging	Optional	A request for reply-charging.
Reply-Deadline	Optional	In case of reply-charging the latest time of submission of replies granted to the recipient(s).
Reply-Charging-Size	Optional	In case of reply-charging the maximum size for reply-MM(s) granted to the recipient(s).
Priority	Optional	The priority (importance) of the message.
Sender visibility	Optional	A request to show or hide the sender's identity when the message is delivered to the recipient.
Read reply	Optional	A request for read reply report.
Subject	Optional	The title of the whole multimedia message.
Reply-Charging-ID	Optional	In case of reply-charging when the reply-MM is submitted within the MM1_submit.REQ this is the identification of the original MM that is replied to.
Content	Optional	The content of the multimedia message

Table 3: Information elements in the MM1_submit.RES.

Information element	Presence	Description
Request Status	Mandatory	The status of the MM submit request.
Request Status Text	Optional	Description which qualifies the status of the MM submit request.
Message ID	Conditional	The identification of the MM if it is accepted by the originator MMS Relay/Server.

3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020151

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **043** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Correction on the MIME Content-Type Message format on MM4
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	January 18th, 2002
Category:	⌘	**A**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	This CR corrects the possible MIME type values that can be included in the MM4_forward.REQ.
Summary of change:	⌘	The current spec references a non existent MIME type (application/multipart). The incorrect Content-Type is removed and replaced by the appropriate text.
Consequences if not approved:	⌘	The technical specification contains inaccuracies.

Clauses affected:	⌘	8.4.4
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at:
http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.4.4 Message format on MM4

All elements of an MM shall be included within a single SMTP "mail" message which shall be organised as MIME message with the appropriate 'Content-Type' [44] header field value (e.g. multipart/related, multipart/mixed, image/jpeg, text/plain).~~type application/multipart.~~ All MM elements shall be of standard MIME content types. In addition to the MM elements this SMTP "mail" message should reflect all MMS information elements according to the definitions in clauses 6 and 8.4.

All other MMS-related messages, such as delivery reports, read-reply reports, transfer acknowledgements shall each be transferred as a single SMTP "mail" message which shall be organised as MIME type text/plain. This SMTP "mail" message should reflect all MMS information elements as defined above.

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11-15 February 2002

T2-020149

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **042** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	**VASP abbreviation**
Source:	⌘	**T2**
Work item code:	⌘	**MESS5-MMS**
Date:	⌘	January 18th, 2002
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	VASP abbreviation missing in abbreviation section
Summary of change:	⌘	VASP definition added
Consequences if not approved:	⌘	Inconsistent specification

Clauses affected:	⌘	3.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3.2 Abbreviations

For the purposes of the present document, the abbreviations defined in [1] and [2] and the following apply:

CDR	Call Data Record
DNS	Domain Name System
EMA	Electronic Message Association
E-Mail	Electronic Mail
ENUM	Electronic Numbering
FQDN	Fully Qualified Domain Name
GW	Gateway
HTTP	Hypertext Transfer Protocol
IANA	Internet Assigned Numbering Authority
IETF	Internet Engineering Task Force
IMAP4	Internet Message Access Protocol
MIME	Multipurpose Internet Mail Extensions
MM	Multimedia Message
MMS	Multimedia Messaging Service
MMSE	Multimedia Messaging Service Environment
MMSNA	Multimedia Messaging Service Network Architecture
MTA	Mail Transfer Agent
PDU	Protocol Data Unit
POP3	Post Office Protocol Version 3
RADIUS	Remote Authentication Dial In User Service
RDF	Resource Description Format
RFC	Request for Comments
SMIL	Synchronised Multimedia Integration Language
SMTP	Simple Mail Transfer Protocol
UA	User Agent
UAProf	User Agent Profile
URI	Uniform Resource Identifiers
VAS	Value Added Service
VASP	Value Added Service Provider
VPIM	Voice Profile for Internet Mail
W3C	WWW Consortium
WAP	Wireless Application Protocol
WIM	WAP Identity Module
WML	Wireless Markup Language
WSP	WAP Session Protocol
WTLS	Wireless Transport Layer Security

3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020148

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **041** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	**Delivery report definition correction**
Source:	⌘	**T2**
Work item code:	⌘	**MESS5-MMS**
Date:	⌘	January 18th, 2002
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	Delivery report functionality is not defined correctly in definition section
Summary of change:	⌘	Delivery report may be requested by the MMS USER Agent or VASP
Consequences if not approved:	⌘	Inconsistent specification

Clauses affected:	⌘	3.1
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3 Definitions and Abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions defined in 3GPP TR 21.905 [2] and 3GPP TS 22.140 [1] and the following apply:

Abstract message: information which is transferred between two MMS entities used to convey an MM and/or associated control information between these two entities

NOTE 1: The application protocol framework and technical realisation of MMS service features is described in terms of abstract messages in the present document.

Delivery Report: feedback information provided to an originator of MM (MMS User Agent or VASP) by an MMS Relay/Server about the status of the delivery of an MM

External Server: network entity/application of an external system such as Internet email, unified messaging system or facsimile to which MMs may be sent to and/or from which MMs may be received by an MMS User Agent via an MMS service provider

NOTE 2: An External Server is connected to that MMS Service Provider via non-MMS-specific protocols.

Forwarding MMS User Agent: MMS User Agent that is the intended recipient of an MM, that requests forwarding of the MM for delivery to other recipient(s) without having to first download the MM

Forwarded MM: MM originally sent from a sender to an intended recipient which is then forwarded to other recipient(s) and to which a delivery report and/or read-reply report may refer and which may be subject to further forwarding

MM Delivery: act of a recipient MMS Relay/Server delivering an MM to a recipient MMS User Agent

MM Submission: act of an originator MMS User Agent submitting an MM to the originator MMS Relay/Server

MMSNA: Multimedia Messaging Service Network Architecture encompasses all the various elements that provide a complete MMS to a user

MMSE: collection of MMS-specific network elements under the control of a single administration

MMS Relay/Server: MMS-specific network entity/application that is under the control of an MMS service provider

NOTE 3: An MMS Relay/Server transfers messages, provides operations of the MMS that are specific to or required by the mobile environment and provides (temporary and/or persistent) storage services to the MMS.

MMS User Agent: application residing on a UE, an MS or an external device that performs MMS-specific operations on a user's behalf

NOTE 4: An MMS User Agent is not considered part of an MMSE.

MMS VAS Applications: Applications providing Value Added Services (e.g. news service or weather forecasts) to MMS users.

Original MM: (initial) MM sent from a sender to a recipient and to which a delivery report and/or a read-reply report and/or a reply-MM may refer and/or which may be subject to being forwarded

Originator MMSE: MMSE associated with the sender of an MM

Originator MMS Relay/Server: MMS Relay/Server associated with the sender of an MM

Originator MMS User Agent: MMS User Agent associated with the sender of an MM

Read-Reply Report: feedback information to an originator MMS User Agent by a recipient MMS User Agent about the status of handling/rendering of an original MM in a recipient MMS User Agent

Recipient MMSE: MMSE associated with the recipient of an MM

Recipient MMS Relay/Server: MMS Relay/Server associated with the recipient of an MM

Recipient MMS User Agent: MMS User Agent associated with the recipient of an MM

Reply-MM: the first reply accepted by the recipient MMS Relay/Server (after checking the reply charging limitations, such as the latest time of submission)in case of reply-charging

Transaction: message pair sent between an MMS User Agent and MMS Relay/Server, or between MMS Relay/Servers

3GPP TSG-T2 #16 **T2-020146**
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CR-Form-v3

CHANGE REQUEST

⌘ **23.140** **CR** **040** ⌘ rev **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☒ Radio Access Network ☐ Core Network ☐

Title:	⌘	Clarification of existing request status codes over MM4
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	020117
Category:	⌘	**B**
Release:	⌘	REL-5

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	The MM4 interface needs to be of carrier grade robustness. One component to accomplish this is to have solid error handling. In the current specification the only means of application level error handling are the request status codes, unfortunately their meaning is unclear in some cases.
Summary of change:	⌘	• Table added to clarify the interpretation of request status codes. • Meaningless request status code made obsolete
Consequences if not approved:	⌘	More unpredictable application level error handling over MM4.

Clauses affected:	⌘	8.4.4.8, new section 8.4.4.10		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request

8.4.4.8 Header Field Value Range

MMS information elements that are mapped to standard STD 11 "header fields", i.e. which do not have an "X-MMS-" prefix, should be used according to [5].

The rest of the header definitions used in this clause, including the mechanisms and pre-defined tokens, are described in an augmented Backus-Naur Form (BNF) defined in [48], similar to that used by RFC 822 [5]. Implementors will need to be familiar with the notation in order to understand these definitions.

For the residual MMS information elements the following applies:

X-Mms-3GPP-MMS-Version:

```
3GPP-MMS-Version = "X-Mms-3GPP-MMS-Version" ":"  1*DIGIT "." 1*DIGIT
"." 1*DIGIT
```

Note that the numbers MUST be treated as separate integers and that each may be incremented higher than a single digit. Thus, 2.1.4 is a lower version than 2.1.13, which in turn is lower than 2.3.0 Leading zeros shall be ignored by recipient MMS Relay/Server and shall NOT be sent. The version is according to the version of the present document (see also clause "Foreword").

X-Mms-Message-Type:

```
Message-type = "X-Mms-Message-Type" ":" ( "MM4_forward.REQ" |
"MM4_forward.RES" | "MM4_delivery_report.REQ" |
"MM4_delivery_report.RES" | "MM4_read_reply_report.REQ" |
"MM4_read_reply_report.RES" )
```

X-Mms-Transaction-Id:

```
Transaction-id =  "X-Mms-Transaction-ID" ":" quoted-string
```

X-Mms-Message-Id:

```
Message-id =  "X-Mms-Message-ID" ":" quoted-string
```

X-Mms-Message-Class:

```
Message-class = "X-Mms-Message-Class" ":" ( Class-identifier |
quoted-string )

Class-identifier = "Personal" | "Advertisement" | "Informational" |
"Auto"
```

X-Mms-Expiry:

```
Expiry-value = "X-Mms-Expiry" ":" ( HTTP-date | delta-seconds )
```

X-Mms-Delivery-Report:

```
Delivery-report =  "X-Mms-Delivery-Report" ":" ( "Yes" | "No" )
```

X-Mms-Priority:

```
Priority = "X-Mms-Priority" ":" ( "Low" | "Normal" | "High" )
```

X-Mms-Sender-Visibility:

```
Sender-visibility = "X-Mms-Sender-Visibility" ":" ( "Hide" | "Show" )
```

X-Mms-Read-Reply:

```
Read-reply = "X-Mms-Read-Reply" ":" ( "Yes" | "No" )
```

X-Mms-Ack-Request:

```
Ack-Request = "X-Mms-Ack-Request" ":" ( "Yes" | "No" )
```

X-Mms-Request-Status-Code:

```
Request-status-Code =  "X-Mms-Request-Status-Code" ":" ( "Ok" |
"Error-unspecified" | "Error-service-denied" | "Error-message-format-
corrupt" | "Error-sending-address-unresolved" | "Error-message-not-
found" | "Error-network-problem" |  "Error-content-not-accepted" |
"Error-unsupported-message" )
```

The meaning of the X-Mms-Request-Status-Code header field is further described in section 8.4.4.10 of this specification.

X-Mms-MM-Status-Code:

```
MM-Status-Code = "X-Mms-MM-Status-Code" ":" ( "Expired" | "Retrieved" |
"Rejected" | "Deferred" | "Intermediate" | "Forwarded" | "Unrecognised"
)
```

8.4.4.10 Request Status Codes Clarification

The table below dictates how the originator MMS Relay/Server should interpret the possible values of the X-Mms-Request-Status-Code header field.

Table XX: Clarification of the Request Status Codes

X-Mms-Request-Status-Code	**Meaning**
Ok	The corresponding request and some or all of its contents were accepted without errors.
Error-unspecified	An unspecified error occurred during the processing or reception of the corresponding request.
Error-service-denied	The corresponding request was rejected due to failure of authentication or authorisation of the originating MMS Relay/Server.
Error-message-format-corrupt	An inconsistency with the message format was detected when the corresponding request was parsed.
Error-sending-address-unresolved	There were no MMS address (From:, To:, Cc:) in its proper format or none of the addresses belong to the recipient MMS Relay/Server.
Error-message-not-found	This status code is obsolete
Error-network-problem	The recipient MMS Relay/Server was not able to accept the corresponding request due to capacity overload.
Error-content-not-accepted	The MM content was not accepted due to size, media type, copyrights or some other reason.
Error-unsupported-	The recipient MMS Relay/Server does not

message	support the corresponding request abstract message.

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Sophia Antipolis, France
11-15 February 2002

CR-Form-v4

CHANGE REQUEST

⌘ **23.140** **CR** **039** ⌘ ev **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	MM4 forward routing failure
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	020117
Category:	⌘	**B**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	There are several reasons why forwarding a MM over MM4 could fail. Currently the only case where there is feedback about forwarding failure back to the originator MMS UA is when address hiding is requested but not supported by the recipient MMS Relay/Server.
Summary of change:	⌘	• Added a section that in a generic way describes how the failure of forwarding a MM over MM4 should be reported back to the originator MMS UA. • Added description in delivery report service description section
Consequences if not approved:	⌘	No means to provide information to originating MMS UA for general MM4 forward routing failure.

Clauses affected:	⌘	7.1.5, 8.4.4.8, new section 7.1.11,
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	.

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

7.1.5 Delivery Report

The MMS Relay/Server shall support the delivery reporting service. Delivery reports shall only be generated for MMs.

The originator MMS User Agent may be able to request a delivery report for a specific MM.

Within an MM notification or upon MM retrieval the recipient MMS User Agent may receive an indication that a delivery report is requested for the MM.

Within either a response to a notification or a response to an MM's delivery, the recipient MMS User Agent may request a delivery report not to be generated by the MMS Relay/Server.

The originator MMS Relay/Server shall generate a delivery report if a delivery report has been requested by the originator MMS User Agent

- upon routing forward the MM, in case the peer entity is not known by the MMS Relay/Server

The originator MMS Relay/Server may generate a delivery report if a delivery report has been requested by the originator MMS User Agent

- upon failure of routing forward the MM

The recipient MMS Relay/Server shall generate a delivery report if a delivery report has been requested by the originator MMS User Agent and if the recipient MMS User Agent did not request a delivery report not to be generated

- upon receipt of a response to a notification, in case the MM is rejected by the recipient MMS User Agent
- upon receipt of a forwarding request, in case the MM is forwarded by the recipient MMS User Agent to other MM recipient(s), without prior retrieval.
- upon receipt of a response to an MM's delivery, in case the MM is retrieved by the MM recipient
- upon expiry of the MM, in case the MM is not rejected and not retrieved by the MM recipient before the expiry

The originator MMS User Agent, i.e. the MMS User Agent receiving the delivery report, may match the delivery report to the sent MM by retaining the message identification of the sent MM and comparing it to the received delivery report, which shall contain the message identification of the original MM. In case of multiple MM recipients, it is necessary for the originator MMS User Agent to retain the MM recipient addresses as well, to match the delivery report to the sent MM.

If a delivery report has been requested by the originator MMS User Agent and if the recipient MMS User Agent did not request a delivery report not to be generated, the recipient MMS Relay/Server

- shall generate the delivery report
- shall deliver the delivery report to the originator MMS Relay/Server.
- shall be responsible for the storage of delivery reports in the network until the originator MMS Relay/Server becomes reachable or until the delivery report expires

Within the delivery report the recipient MMS Relay/Server

- shall provide the MM originator address to the originator MMS Relay/Server.
- shall provide the MM recipient address to the originator MMS Relay/Server.

- shall provide the identification of the original MM for which the delivery report has been generated to the originator MMS Relay/Server.

- shall provide status information how the MM was handled (e.g. expired, rejected, delivered, forwarded or indeterminate) to the originator MMS Relay/Server

- shall provide a time stamp when the MM was handled to the originator MMS Relay/Server

For each MM recipient of the original MM for which the delivery report has been generated and becomes available at the originator MMS Relay/Server, the originator MMS Relay/Server

- shall deliver the delivery report to the originator MMS User Agent (i.e. the recipient MMS User Agent of the delivery report).

Within the delivery report the originator MMS Relay/Server

- shall provide the MM recipient's address to the originator MMS User Agent (the recipient MMS User Agent of the delivery report).

- shall provide the identification of the original MM for which the delivery report has been generated to the originator MMS User Agent (the recipient MMS User Agent of the delivery report).

- shall be responsible for the storage of delivery reports in the network until the originator MMS User Agent becomes reachable (e.g. user moves back into coverage, switches MMS User Agent on) or until the delivery report expires

7.1.11 MM4 forward routing failure

If the interworking between two MMS Relay/Servers fails and a MM can not be routed forward across MM4, the originator MMS UA should be notified. If the MMS UA is notified the procedures described in this section shall be followed.

In case the originator MMS UA has requested a delivery report to a MM that failed to be routed forward across MM4, the originator MMS Relay/Server shall generate and send a delivery report that informs the originator MMS UA about the error.

In case the originator MMS UA has not requested a delivery report to a MM that failed to be routed forward across MM4, the originator MMS Relay/Server may generate and send a MM that informs the originator MMS UA about the error.

3GPP TSG-T2 #16 **T2-020144**
Sophia Antipolis, France
11-15 February 2002

CR-Form-v4

CHANGE REQUEST

⌘ **23.140** **CR** **038** ⌘ ev **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Introduction of SMTP service extensions over MM4
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	020117
Category:	⌘	**B**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	To make the interworking between two MMSEs over MM4 as robust and reliable as possible a simple reference to RFC 2821 is not enough. There are service extensions to SMTP that would be beneficial, or even crucial, to include in the specification of MM4.
Summary of change:	⌘	Two RFCs relating to SMTP service extensions are added to be used over MM4. • Message Size Declaration • 8bit MIME transport
Consequences if not approved:	⌘	The MM4 reference point will be less stringently defined, resulting in increased risk for interoperability problems and a less functional MM4.

Clauses affected:	⌘	2, new section 8.4.5.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TS 22.140: "Multimedia Messaging Service; Stage 1".

[2] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[3] WAP Forum: "Wireless Application Environment Specification, Version 1.2", WAP-WAESpec-19991104, . URL: http://www.wapforum.org/.

[4] 3GPP TS 23.057: "Mobile Execution Environment (MExE); Functional description; Stage 2".

[5] IETF; STD 0011 (RFC 2822): "Internet Message Format", URL: http://www.ietf.org/rfc/rfc2822.txt.

[6] IETF; RFC 2046: "Multipurpose Internet Mail extension (MIME) Part Two: Media Types", URL: http://www.ietf.org/rfc/rfc2046.txt.

[7] The Unicode Consortium: "The Unicode Standard", Version 2.0, Addison-Wesley Developers Press, 1996.URL: http://www.unicode.org/.

[8] ANSI X3.4, 1986: "Information Systems; Coded Character Set 7 Bit; American National Standard Code for Information Interchange".

[9] ISO/IEC 8859-1:1998: "Information Processing; 8-bit Single-Byte Coded Graphic Character Sets; Part 1: Latin Alphabet No. 1".

[10] IETF; RFC 2279: "UTF-8, A Transformation format of ISO 10646", URL: http://www.ietf.org/rfc/rfc2279.txt.

[11] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[12] 3GPP TS 26.090: "Mandatory Speech Codec speech processing functions; AMR Speech Codec Transcoding Functions".

[13] 3GPP TS 26.093 (V3.1.0): "Mandatory Speech Codec speech processing functions; AMR Speech Codec; Source Controlled Rate Operation".

[14] ISO/IEC 11172-3:1993: "Information technology; Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s; Part 3: Audio" (MP3, MPEG1-Audio, MPEG2-Audio)

[15] MIDI Manufacturers Association Incorporated, Los Angeles, California: “MIDI Sample Dump Standard (SDS)”; URL: http://www.midi.org.

[16] ISO/IEC 14496-2:1999/FDAM4, ISO/IEC JTC1/SC 29/WG11 N3904, Pisa, January, 2001

[17] ITU-T Recommendation T.81 | ISO/IEC 10918-1:1994: "Information technology; Digital compression and coding of continuous-tone still images: Requirements and guidelines".

[18] Compuserve Incorporated, Columbus, Ohio (1990): "Graphics Interchange Format (Version 89a)".

[19] ISO/IEC 14496-2:1999: "Information technology; Coding of audio-visual objects; Part 2: Visual".

[20] ITU-T Recommendation H.263 (1998): "Video coding for low bit rate communication".

[21] ITU-T Recommendation H.263 (1998): "Video coding for low bit rate communication - Annex X, Profiles and Levels Definition"

[22] IETF; STD 0010 (RFC 2821): "Simple Mail Transfer Protocol", URL: http://www.ietf.org/rfc/rfc2821.txt.

[23] WAP Forum (November 1999): "WAP Wireless Session Protocol", WAP-WSP-19991105- , URL: http://www.wapforum.org/.

[24] WAP Forum (November 1999): "WAP Push Access Protocol", WAP-PAP-19991108, URL: http://www.wapforum.org/.

[25] WAP Forum (November 1999): "WAP User Agent Profile Specification", WAP-UAProf-19991110, URL: http://www.wapforum.org/.

[26] W3C Recommendation 22 February 1999 "Resource Description Framework (RDF) Model and Syntax Specification", URL: http://www.w3.org/TR/REC-rdf-syntax.

[27] WAP Forum (November 1999): "WAP Wireless Markup Language Specification, Version 1.2 ", WAP-WML-19991104, URL: http://www.wapforum.org/.

[28] W3C Recommendation 15-June-1998: "Synchronized Multimedia Integration Language (SMIL) 1.0 Specification" - http://www.w3.org/TR/REC-smil/.

[29] WAP Forum (November 1999): "WAP Wireless Transport Layer Security Specification", WAP-WTLS-19991105, URL: http://www.wapforum.org/.

[30] WAP Forum (November 1999): "WAP Identity Module Specification", WAP-WIM-19991105, URL: http://www.wapforum.org/.

[31] ITU-T Recommendation T.37 (06/98): "Procedures for the transfer of facsimile data via store-and-forward on the Internet".

[32] ITU-T Recommendation T.30 (1996): "Procedures for document facsimile transmission in the general switched telephone network".

[33] IETF; RFC 2421 (Sept. 1998): "Voice Profile for Internet Mail – version 2, VPIM" , URL: http://www.ietf.org/rfc/rfc2421.txt.

[34] IETF; STD 0053 (RFC 1939): "POP 3, Post Office Protocol - Version 3" , URL: http://www.ietf.org/rfc/rfc1939.txt.

[35] IETF; RFC 1730 (December 1994): "IMAP4, Internet Message Access Protocol - Version 4" , URL: http://www.ietf.org/rfc/rfc1730.txt..

[36] Adobe Systems: "Tag Image File Format (TIFF), Version 6", URL:, http://www.adobe.com.

[37] 3GPP TR 23.039: "Interface protocols for the connection of Short Message Service Centres (SMSCs) to Short Message Entities (SMEs)".

[38] ISO/IEC TR 13818-5:1997/Amd 1:1999 "Advanced Audio Coding (AAC)"

[39] IETF; Internet draft: "RTP payload format and file storage format for AMR and AMR-WB audio"; URL: http://search.ietf.org/internet-drafts/draft-ietf-avt-rtp-amr-10.txt..

NOTE: Reference [39] is work in progress in IETF/AVT working group and to be replaced by the appropriate RFC number once the Internet draft is approved within the IETF (IESG approval is scheduled to spring/summer 2001).

[40] 3GPP TS 26.233: "End-to-end transparent streaming Service (PSS); General Description".

[41] 3GPP TS 26.234: "End-to-end transparent streaming Service (PSS); Protocols and Codecs".

[42] IETF; Internet Draft: "TCP over 2.5G and 3G Wireless Networks"; URL: http://search.ietf.org/internet-drafts/draft-ietf-pilc-2.5g3g-03.txt

NOTE: Reference [42] has to be replaced by the appropriate RFC number once the Internet draft is approved within the IETF.

[43] WAP Forum: "Wireless profiled TCP", WAP-225-TCP-20010331-a, URL: http://www.wapforum.org

[44] IETF; RFC 2045: "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies", URL: http://www.ietf.org/rfc/rfc2045.txt

[45] IETF; RFC 2047: "Multipurpose Internet Mail Extensions (MIME) Part Three: Message Header Extensions for Non-ASCII-Text", URL: http://www.ietf.org/rfc/rfc2047.txt.

[46] IETF; RFC 2048: "Multipurpose Internet Mail Extensions (MIME) Part Four: Registration Procedures", URL: http://www.ietf.org/rfc/rfc2048.txt.

[47] IETF; RFC 2049: "Multipurpose Internet Mail Extensions (MIME) Part Five: Conformance Criteria and Examples", URL: http://www.ietf.org/rfc/rfc2049.txt.

[48] IETF; RFC 2616: “Hypertext Transfer Protocol, HTTP/1.1”, URL: http://www.ietf.org/rfc/rfc2616.txt.

[49] IETF; STD 13 (RFC 1034, 1035): "Domain Names -- concepts and facilities", "Domain names – implementation and specification", URL: http://www.ietf.org/rfc/rfc1034.txt, http://www.ietf.org/rfc/rfc1035.txt.

[50] IETF; STD 14 (RFC 947): "Multi-network broadcasting within the Internet", URL: http://www.ietf.org/rfc/rfc947.txt.

[51] IETF; RFC 2076: "Common Internet Message Headers", URL: http://www.ietf.org/rfc/rfc2076.txt.

[52] IETF; RFC 1893: "Enhanced Mail System Status Codes", URL: http://www.ietf.org/rfc/rfc1893.txt.

[53] IETF; RFC 1327: "Mapping between X.400(1988)/ISO 10021 and RFC 822", URL: http://www.ietf.org/rfc/rfc1327.txt.

[54] 3GPP TS 29.061: "Interworking between the Public Land Mobile Network (PLMN) supporting Packet Based Services and Packet Data Networks (PDN)"

[55] WAP-183-ProvCont, Provisioning Content, URL: http://www.wapforum.org

[56] WAP-209-MMSEncapsulation, MMS Encapsulation Protocol, URL: http://www.wapforum.org

[57] IETF; RFC 1870: “SMTP Service Extension for Message Size Declaration”, URL: http://www.ietf.org/rfc/rfc1870.txt.

[58] IETF; RFC 1652: “SMTP Service Extension for 8bit-MIME transport”, URL: http://www.ietf.org/rfc/rfc1652.txt.

8.4.5.2 SMTP Service Extensions

This section specifies the usage of SMTP service sxtensions [22] over MM4.

The following SMTP service extensions should be supported by the MMS Relay/Server for the interworking over MM4:

- SMTP Service Extension for Message Size Declaration [57]
- SMTP Service Extension for 8bit-MIME transport [58]

3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020140

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **037** ⌘ **rev** **-** ⌘ Current version: **5.1.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Correction on the SMTP-address encoding
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	January 12th, 2002
Category:	⌘	**A**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	This CR corrects the SMTP-address encoding according to the RFC 2822.
Summary of change:	⌘	The current specification omits to include the '<' and '>' characters in the SMTP-address as it is described in RFC 2822. This CR corrects this omission.
Consequences if not approved:	⌘	The specification will contain inaccuracies related to the SMTP-address encoding.

Clauses affected:	⌘	8.4.5.1
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at:
http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.4.5 Message Transfer Protocol on MM4

Interworking between different MMSEs shall be based on SMTP according to STD 10 [22] as depicted in figure 5.

The originator MMS Relay/Server should use an SMTP connection to transfer MMs/abstract messages. The originator MMS Relay/Server should use the sender's address as indicated in the corresponding MM/abstract message in the SMTP "MAIL FROM:" command (subject to the sender's visibility) and should use the recipient's address(es) as indicated in the corresponding MM/abstract message in the SMTP "RCPT TO:" command. The originator MMS Relay/Server should use SMTP "DATA" command to transfer the message.

Private agreements may utilise additional connection and security (e.g. IPSec) methods. Such methods are out of the scope of standardisation for this release.

8.4.5.1 Address Encoding

In the case where E.164 addressing is used and the address resolution returns the domain of the recipient MMSE, the addresses shall be encoded in the following way:

SMTP protocol level:

```
SMTP-address = "<" MMS-address "@" domain ">"
MMS-address = "+" E.164 "/TYPE=PLMN"
E.164 = 1*DIGIT
domain = dom-fragment *( "." dom-fragment )
dom-fragment = ( ALPHA | DIGIT ) *( ALPHA | DIGIT | "-" )
```

Example:

If the originator's address was an E.164 address, the address fields used in RCPT shall be converted to the following format by the sender's MMS Relay/Server:

+E.164/TYPE=PLMN@recipient-mmse

where recipient-mmse is a FQDN of the recipient's MMS Relay/Server, e.g.

+358401234567/TYPE=PLMN@mmse.sonera.net

SMTP commands:

SMTP commands should be then used in the following way:

```
MAIL FROM: SMTP-address
RCPT TO: SMTP-address
DATA
X-MMS-3GPP-MMS-version: 4.2.0
X-MMS-Message-Type: MM4_forward.REQ
X-MMS-Transaction-ID: “ABCDEFGHIJ0123456789”
X-MMS-Message-ID: “originator-mmse/originator-username/123456789”
Date: Wed, 16 May 2001 10:35:00 +0800
From: MMS-address
To: MMS-address
Subject: Greetings from Greece
```

```
Content-Type: text/plain

Hi, …
.
```

NOTE: In the example above the "X-MMS-3GPP-MMS-version" header may not refer to the current version of the present document.

3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020154

CR-Form-v3

CHANGE REQUEST

⌘ **23.140** **CR** **036** ⌘ rev **-** ⌘ Current version: **4.5.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network X

Title:	⌘	Correction of the Forwarding Feature
Source:	⌘	SIEMENS AG
Work item code:	⌘	MMS
Date:	⌘	January, 22nd, 2002
Category:	⌘	**F**
Release:	⌘	REL-4

Use one of the following categories:
- ***F*** *(essential correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(Addition of feature),*
- ***C*** *(Functional modification of feature)*
- ***D*** *(Editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	Implementations of the MM1 interface have highlighted that there is an essential need for clarification of the forwarding information on the MM1 interface for message retrieval. It is unclear which addressing and date/time information is contained on both the MM1 and MM4 interfaces when a message has been forwarded.
Summary of change:	⌘	The Usage of the Date and Time Information Elements and the Sender Address IE are clarified for the message forwarding use case. To ensure backwards compatibility the Sender Address and the Date and Time IE shall contain the appropriate information that is related to the last handling of the MM by an MMS User Agent, i.e. either submission or forwarding of the MM. Additionally an forwarded MM may contain the address(es) of the MMS User Agent(s) that previously handled the MM. The Information Element “Forwarded-by” is renamed to “Previously-sent-by” to better match the changed meaning of the field. The behaviour of the MMS Relay/Server is described for the case when sender anonymity has been requested upon submission of the MM that is forwarded.
Consequences if not approved:	⌘	Incompatible implementations of the MM1_retrieve.RES and MM4_forward.REQ abstract messages.

Clauses affected:	⌘	6.1.4, 8.1.2.3, 8.1.2.4, 8.1.3.3, 8.1.3.4, 8.4.1.3, 8.4.1.4, 8.4.4.2, 8.4.4.8
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications
	⌘	
Other comments:	⌘	This is a resubmission of T2M020094 from SWG3#10

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

…

6 MMS Service Behaviour Description

6.1 MMS services offered

…

6.1.4 Forwarding of a Multimedia Message without prior Retrieval

This part of the MMS service describes the mechanism by which an MMS User Agent may request the corresponding MMS Relay/Server, that an MM for which the MMS User Agent is the intended recipient (and is notified of the MM) be forwarded to other specified recipient(s) MMS User Agent(s) whose address(es) shall be specified by the forwarding MMS User Agent, without having to first retrieve the MM.

The support for originating a request that a specific MM be forwarded is optional for the MMS User Agent.

The support for forwarding an MM, in response to a request from a MMS User Agent that a specific MM be forwarded is optional for the MMS Relay/Server.

The original MM is forwarded to a new recipient(s) with the forwarding MMS User Agent's address being provided but without additional content, and without affecting the elements of the original MM. Some additional information elements e.g. delivery report, read-reply report, i.e. requests for reports which are to provide feedback on the forwarded MM to the forwarding MMS User Agent, may be supplied.

MM Element Forwarding, where particular elements of an MM are requested to be forwarded, is left for standardisation in future releases.

~~If a forwarding MMS User Agent supports~~ Upon requesting an MM to be forwarded~~ing~~ the MMS User Agent ~~shall~~:

- shall indicate the address of the MM recipient(s),
- shall provide the message reference provided in the MM Notification,
- shall not request address hiding,
- shall not generate a read-reply report to the originator MMS User Agent even if a read-reply report is requested.

~~If a MMS User Agent supports requesting forwarding of MMs the forwarding MMS User Agent may:~~

- may ~~I~~indicate the address of the ~~F~~forwarding MMS User Agent (i.e. it's own address),
- may ~~P~~provide a time stamp for the time of submission of the request to forward the MM,
- may ~~S~~set the desired time of expiry for the forwarded MM,
- may ~~S~~set the earliest desired time of delivery for the forwarded MM,
- may ~~R~~request a delivery report for the forwarded MM,
- may ~~R~~request a read-reply report for the forwarded MM.

Upon reception of a request from a forwarding MMS User Agent to forward an MM, the forwarding MMS Relay/Server

- shall assign a Message Identification to the forwarded MM and immediately provide the forwarding MMS User Agent with this Message Identification,
- shall provide status information on the MM forward request to the forwarding MMS User Agent,

- is responsible for retaining the forwarded MM until the earliest desired time of delivery, if the optional feature of earliest time of delivery is supported by the MMS Relay/Server of the forwarding MMS User Agent. If this feature is not supported then the MM is immediately routed forward,
- may provide a time stamp of the MM submission,
- shall not provide the MM originator's address if the originator MMS User Agent requested its address to be hidden from the MM recipient(s),
- shall not route forward the request for address hiding of the MM originator,
- shall provide the address of the MMS User Agent that requested forwarding of the MM,
- ~~may~~ shall provide a time stamp for the request to forward~~ed~~ the MM~~, i.e~~. ~~i~~It may also override the forwarding MMS User Agent's time stamp,
- shall insert the forwarding MMS User Agent's address into the forwarded MM if not yet provided,
- may override the address provided by the forward~~ed~~ing request~~MM~~ (subject to MMS service provider's preferences),
- is responsible for resolving the recipient's address(es) of the forwarded MM,
- is responsible to route the forwarded MM towards the MM recipient(s),
- shall pass the indication whether or not a delivery report is requested unaltered when routing the forwarded MM towards the MM recipient(s),
- shall pass the indication whether or not a read-reply report is requested unaltered when routing the forwarded MM towards the MM recipient(s),
- shall generate a delivery report indicating "indeterminate" status of the MM's delivery if a delivery report was requested by the ~~forwarding~~last MMS User Agent that handled the message and if the peer entity the MM is routed forward to is not known to the MMS Relay/Server of the forwarding MMS User Agent,
- shall provide the recipient~~(s)~~ MMS Relay/Server(s) with a count of the number of times that the particular MM was forwarded,
- shall provide the recipient~~(s)~~ MMS Relay/Server(s) with a list of addresses of forwarding MMS User Agents for the MM,
- shall generate a delivery report to the originator MMS User Agent if a delivery report is requested.

A special case is where the recipient MMS Relay/Server is also the forwarding MMS Relay/Server. In this case the MM does not have to be routed forward.

6.1.5 Delivery Report

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6.1.9 Address Hiding in MMS

An originator MMS User Agent may support a request for the sender's address to be hidden from the recipient(s). An MMSE may support such a request, i.e., it may allow address hiding. In any case, a recipient MMSE shall ensure that a sender's address is hidden from the recipient MMS User Agent when address hiding is requested for an MM.

If the originator's MMS Relay/Server does not allow address hiding (anonymous messages) (e.g. legislation does not permit anonymous messages) a message containing a request for address hiding shall be rejected upon submission and the originator's MMS Relay/Server shall return an error information to the originator MMS User Agent.

In the case of originator's MMS Relay/Server rejects the message because it does not allow address hiding the rejection information shall be delivered in a submit response together with optional status text.

In case the recipient MMS Relay/Server rejects the message because it does not allow address hiding and the originator MMS User Agent has requested a delivery report, then the recipient MMS Relay/Server shall inform the originator of the message rejection within the delivery report.

In case the recipient MMS Relay/Server rejects the message because it does not allow address hiding and the originator MMS User Agent has not requested a delivery report, then the originator MMS Relay/Server may inform the MM originator by generating a new MM which is sent back to the MM originator.

Independent of whether or not the originator's address is shown or hidden to the recipient, the originator may be able to ask for a delivery report to an MM and also receive the delivery report according to the normal behaviour of the MMS framework.

If the originator MMS User Agent has requested both its address to be hidden and a read-reply report the originator MMS User Agent might not receive the read-reply report.

If the recipient forwards the MM outside the MMSE and the peer entity is unknown to the forwarding MMS Relay/Server the recipient MMS Relay/Server shall not transfer the originator's address but replace it with either appropriate coded address or leave the originator address field blank.

In case of forwarding an MM without prior retrieval the forwarding MMS User Agent shall not request her address to be hidden.

6.1.10 Support for Reply-Charging in MMS

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8 MMS Application Protocol Framework and Technical Realisation of MMS Service Features

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8.1.2 Multimedia Message Notification

This part of the MMS service covers the notification about MM from the recipient MMS Relay/Server to the corresponding recipient MMS User Agent and involving abstract messages are outlined in Table 4 from type, and direction points of view.

Table 4: abstract messages for notification of MM in MMS

Abstract message	Type	Direction
MM1_notification.REQ	Request	MMS Relay/Server -> MMS UA
MM1_notification.RES	Response	MMS UA -> MMS Relay/Server

8.1.2.1 Normal Operation

Upon receiving the MM1_notification.REQ, the recipient MMS User Agent shall respond with the MM1_notification.RES to the recipient MMS Relay/Server to acknowledge the successful reception of the MM1_notification.REQ.

The MM1_notification.RES shall unambiguously refer to the corresponding MM1_notification.REQ.

8.1.2.2 Abnormal Operation

In this case the MMS UA shall respond with a MM1_notification.RES encapsulating a status which indicates the reason the notification could not be processed. If the MMS UA does not provide the MM1_notification.RES the MMS Relay/Server should be able to retransmit the notification at a later state.

8.1.2.3 Features

Addressing: The MM originator address may be provided to the recipient MMS User Agent in the MM1_notification.REQ. The MM originator address shall not be provided to the recipient MMS User Agent if the MM originator has requested her address to be hidden from the MM recipient. In the case of forwarding, the address of the latest forwarding MMS User Agent shall be provided.

Time constraints: The recipient MMS User Agent shall be provided a time of expiry of the MM. In case of reply-charging the deadline for the latest time of submission of a reply-MM should be conveyed within the MM1_notification.REQ.

Reply-Charging: In case of reply-charging the MMS Relay/Server may indicate in the MM1_notification.REQ that a reply to the notified original MM is free of charge and the reply-charging limitations.

Message class, message size and subject: The MM shall be qualified further by adding a message class and an approximate size to the MM in the MM1_notification.REQ. The MM may be qualified further by adding a subject to the MM. Additional qualifiers may be added.

Reporting: If the originator MMS User Agent has requested to have a delivery report, the recipient MMS Relay/Server may convey this information to the recipient MMS User Agent in the MM1_notification.REQ. The recipient MMS User Agent may indicate in the MM1_notification.RES that it would not wish a delivery report to be created.

Identification: In case of reply-charging when a reply-MM is notified within the MM1_notification.REQ the MMS Relay/Server should convey the identification of the original MM replied to within the same MM1_notification.REQ.

Message Reference: The recipient MMS Relay/Server shall always provide a reference, e.g., URI, for the MM in the MM1_notification.REQ.

MM Status: The recipient MMS User Agent may indicate in the MM1_notification.RES how it intends the MM to be handled, e.g. the immediate rejection of the MM.

8.1.2.4 Information Elements

Table 5: Information elements in the MM1_notification.REQ.

Information element	Presence	Description
Message class	Mandatory	The class of the MM (e.g., personal, advertisement, information service; default = personal)
Message size	Mandatory	The approximate size of the MM
Time of expiry	Mandatory	The time of expiry for the MM.
Message Reference	Mandatory	a reference, e.g., URI, for the MM
Subject	Optional	The title of the whole MM.
Sender address	~~Optional~~Conditional	~~The address of the MM originator.~~ The address of the MMS User Agent that most recently handled the MM, i.e. that either submitted or forwarded the MM. If the originator MMS User Agent has requested her address to be hidden from the recipient her address shall not be provided to the recipient.
Delivery report	Optional	Request for delivery report
Reply-Charging	Optional	Information that a reply to this particular original MM is free of charge.
Reply-Deadline	Optional	In case of reply-charging the latest time of submission of a reply granted to the recipient.
Reply-Charging-Size	Optional	In case of reply-charging the maximum size of a reply-MM granted to the recipient.
Reply-Charging-ID	Optional	The identification of the original MM replied to if this notification indicates a reply-MM.

Table 6: Information elements in the MM1_notification.RES.

Information element	Presence	Description
MM Status	Optional	The status of the MM's retrieval
Report allowed	Optional	Request to allow or disallow the sending of a delivery report to the MM originator

8.1.3 Retrieval of Multimedia Message

This part of MMS service covers the retrieval of an MM. For retrieval purposes an MM shall always be retrieved by the recipient MMS User Agent from the recipient MMS Relay/Server. Involved abstract messages are outlined in Table 7 from type and direction points of view.

Table 7: Abstract messages for retrieval of MM in MMS

Abstract messages	Type	Direction
MM1_retrieve.REQ	Request	MMS UA -> MMS Relay/Server
MM1_retrieve.RES	Response	MMS Relay/Server -> MMS UA
MM1_acknowledgement.REQ	Request	MMS UA -> MMS Relay/Server

8.1.3.1 Normal Operation

The recipient MMS User Agent shall issue an MM1_retrieve.REQ to the recipient MMS Relay/Server to initiate the retrieval process. The MMS Relay/Server shall respond with an MM1_retrieve.RES, which contains MMs control information and the MM content.

After receiving the MM1_retrieve.RES, the recipient MMS User Agent shall send an MM1_acknowledgement.REQ to the corresponding MMS Relay/Server, if requested by the MMS Relay/Server. The MM1_acknowledgement.REQ shall unambiguously refer to the corresponding MM1_retrieve.RES.

8.1.3.2 Abnormal Operation

If the recipient MMS Relay/Server can not process the MM1_retrieve.REQ, for example due to invalid content location or expiration of the message, the recipient MMS Relay/Server shall respond with either an MM1_retrieve.RES or a lower protocol layer error message encapsulating a status which indicates the reason to the MMS User Agent the multimedia message was not delivered.

If the MMS Relay/Server does not provide the MM1_retrieve.RES or the lower protocol layer error message the MMS User Agent should be able to recover.

8.1.3.3 Features

Message Reference: The recipient MMS User Agent shall always provide a reference, e.g., URI, for the MM in the MM1_retrieve.REQ.

Addressing: The MM originator address may be provided to the recipient MMS User Agent in the addressing-relevant information field of MM1_retrieve.RES. The MM originator address shall not be provided to the recipient MMS User Agent if the MM originator has requested her address to be hidden from the MM recipient. In the case of forwarding, the address of the latest forwarding MMS User agent shall be provided and the address(es) of the previous forwarding MMS User Agent(s) and the address of the originator MMS User Agent may be provided. One or several address(es) of the MM recipient(s) may be provided to the recipient MMS User Agent in the addressing-relevant information field(s) of the MM1_retrieve.RES.

Time stamping: The MM1_retrieve.RES shall carry the time and date of the most recent handling of the MM by an MMS User Agent (i.e. either submission or the most recent forwarding of the MM). In the case of forwarding, the MM1_retrieve.RES may in addition carry the time and date of the submission of the MM.~~of submission of the MM or the time and date of the forwarding of the MM~~.

Time constraints: In case of reply-charging the deadline for the latest time of submission of a reply-MM shall be conveyed within the MM1_retrieve.RES.

Message class, priority and subject: Information about class, priority, subject of the MM shall be included in the MM1_retrieve.RES according to their presence and value received at the MMS Relay/Server. Information about additional end-to-end qualifiers of the MM should be included in the MM1_retrieve.RES according to their presence and value received at the MMS Relay/Server.

Reporting: If the originator MMS User Agent has requested to have a read-reply report, the recipient MMS Relay/Server shall convey this information in the MM1_retrieve.RES. If the originator MMS User Agent has requested to have a delivery report, the recipient MMS Relay/Server may convey this information to the recipient MMS User Agent in the MM1_retrieve.RES. If a request for a delivery report is included in the MM1_retrieve.RES the recipient MMS User Agent shall convey the information whether it accepts or denies the sending of a delivery report to the MM originator in MM1_acknowledgement.REQ. If a delivery report is not requested, it is up to the recipient MMS User Agent to include this information in MM1_acknowledgement.REQ or not.

Reply-Charging: In case of reply-charging the MMS Relay/Server should indicate in the MM1_retrieve.RES that a reply to this particular original MM is free of charge and the reply-charging limitations.

Identification: The MMS Relay/Server shall provide a message identification for a message, which it has accepted for delivery in the MM1_retrieve.RES. In case of reply-charging the MMS Relay/Server shall provide the message-ID of the original MM which is replied to in the MM1_retrieve.RES.

Content Type: The type of the MM's content shall always be identified in the MM1_retrieve.RES.

Content: The content of the multimedia message if added by the originator MMS User Agent of the MM may be conveyed in the MM1_retrieve.RES.

Status: In case of normal operation the recipient MMS Relay/Server may indicate in the MM1_retrieve.RES that the retrieval of the MM was processed correctly. In case of abnormal operation the recipient MMS Relay/Server shall indicate in the MM1_retrieve.RES the reason why the multimedia message could not be retrieved. The corresponding reason codes should cover application level errors (e.g. "the media format could not be converted", "insufficient credit for retrieval"). Lower layer errors may be handled by corresponding protocols.

~~**Forwarded_by:** The address of the forwarding MMS User Agent. Multiple addresses are possible. In the multiple address case this is a sequential list of the address(es) of the forwarding MMS User Agents who forwarded the same MM.~~

Previously-sent-by: The address(es) of the MMS User Agent(s) that submitted or forwarded the MM prior to the last forwarding MMS User Agent. In the multiple forwarding case the order of the provided addresses shall be indicated and the address of the originator MMS User Agent shall be indicated, if present.

Note: The address of the last forwarding MMS User Agent is carried in other addressing elements.

8.1.3.4 Information Elements

Table 8: Information elements in the MM1_retrieve.REQ

Information element	Presence	Description
Message Reference	Mandatory	Location of the content of the MM to be retrieved.

Table 9: Information elements in the MM1_retrieve.RES

Information element	Presence	Description
Message ID	Mandatory	The message ID of the MM.
Sender address	Conditional	The address of the MMS User Agent that most recently handled the MM, i.e. that either submitted or forwarded the MM. If the originator MMS User Agent has requested her address to be hidden from the recipient her address shall not be provided to the recipient.~~The address of the originator of MM unless the originator MMS User Agent has requested her address to be hidden from the MM recipient.~~
Content type	Mandatory	The content type of the MM's content.
Recipient address	Optional	The address of the MM recipient. Multiple addresses are possible.
Message class	Optional	The class of the message (e.g., personal, advertisement, information service)
Date and time	Mandatory	The time and date of the most recent handling (i.e. either submission or forwarding) of the MM by an MMS User Agent.~~submission of the MM or the time and date of the forwarding of the MM (time stamp)~~
Delivery report	Optional	A request for delivery report.
Priority	Conditional	The priority (importance) of the message if specified by the originator MMS User Agent..
Read reply	Conditional	A request for read-reply report if the originator MMS User Agent of the MM has requested a read-reply report.
Subject	Conditional	The title of the whole multimedia message if specified by the originator MMS User Agent of the MM.
Status	Optional	The status of the MM retrieve request.
Status Text	Optional	Description which qualifies the status of the MM retrieve request.
Reply-Charging	Optional	Information that a reply to this particular original MM is free of charge.
Reply-Charging-ID	Optional	In case of reply-charging this is the identification of the original MM replied to.
Reply-Deadline	Optional	In case of reply-charging the latest time of submission of a reply granted to the recipient.
Reply-Charging-Size	Optional	In case of reply-charging the maximum size of a reply-MM granted to the recipient.
Previously-sent-by~~Forwarded_by~~	Optional~~Conditional~~	In case of forwarding this information element contains one or more address(es) of MMS User Agent(s) that handled (i.e. forwarded or submitted) the MM prior to the MMS User Agent whose address is contained in the Sender address information element. The order of the addresses provided shall be marked. The address of the originator MMS User Agent shall be marked, if present.~~The address of the forwarding MMS User Agent. Multiple addresses are possible. In the multiple address case this is a Sequential list of the address(es) of the forwarding MMS User Agents who forwarded the same MM.~~
Previously-sent-date-and-time	Optional	The date(s) and time(s) associated with submission and forwarding event(s) prior to the last handling of the MM by an MMS User Agent.
Content	Conditional	The content of the multimedia message if specified by the originator MMS User Agent of the MM.

Table 10: Information elements in the MM1_acknowledgement.REQ

Information element	Presence	Description
Report allowed	Optional	Request to allow or disallow the sending of a delivery report to the MM originator

8.1.4 Forwarding of Multimedia Message

This part of the MMS service describes the mechanism by which a forwarding MMS User Agent can request from the corresponding MMS Relay/Server, that an MM for which the MMS User Agent is the intended recipient (and is notified of the MM) be forwarded to other specified recipient(s) MMS User Agent(s) whose address(es) shall be specified by the forwarding MMS User Agent, without having to first retrieve the MM.

For forwarding purposes an MM forward request shall always be requested by the forwarding MMS User Agent from the forwarding MMS Relay/Server. Involved abstract messages are outlined in Table 11 from type and direction points of view.

Table 11: Abstract messages for forwarding of MM without prior retrieval

Abstract messages	Type	Direction
MM1_forward.REQ	Request	MMS UA -> MMS Relay/Server
MM1_forward.RES	Response	MMS Relay/Server -> MMS UA

8.1.4.1 Normal operation

The forwarding MMS User Agent shall issue an MM1_forward.REQ to the forwarding MMS Relay/Server, which contains MMS control information. The MMS Relay/Server shall respond with an MM1_forward.RES, which provides the status of the request. The MM1_forward.RES shall unambiguously refer to the corresponding MM1_forward.REQ. Support for MM1_forward.REQ is optional for the MMS User Agent. Support for MM1_forward.RES is optional for the MMS Relay/Server.

8.1.4.2 Abnormal Operation

In this case the MMS Relay/Server shall respond with an MM1_forward.RES encapsulating a status which indicates the reason the request for forwarding was not accepted, e.g. no subscription, service not available, invalid content location, message expired.

If the MMS Relay/Server does not provide the MM1_forward.RES the MMS User Agent should be able to recover.

8.1.4.3 Features

Addressing: One or several recipients of an MM forward request shall be indicated in the addressing-relevant information field(s) of the MM1_forward.REQ. The forwarding MMS User Agent may be indicated in addressing-relevant information field(s) of the MM1_forward.REQ.

Time stamping: The forwarding MMS User Agent may time stamp the MM.

Time constraints: The forwarding MMS User Agent may request an earliest desired time of delivery of the MM. The forwarding MMS User Agent may request a time of expiry for the MM.

Reporting: The forwarding MMS User Agent may request a delivery report for the MM. In addition, the forwarding MMS User Agent may request a read-reply report when the user has viewed the MM.

Identification: The MMS Relay/Server of the forwarding MMS User Agent shall always provide a message identification for an MM forward request, which it has accepted for being forwarded in the MM1_forward.RES.

Message Reference: The forwarding MMS User Agent shall always provide the reference, e.g., URI, for the MM in the MM1_forward.REQ which was provided in MM1_notification.REQ.

Status: The MMS Relay/Server of the forwarding MMS User Agent shall indicate the status of the MM1_forward.REQ in the MM1_forward.RES. The reason code given in the status information element of the MM1_forward.RES may be supported with an explanatory text further qualifying the status. If this text is available in the status text information element the MMS User Agent should bring it to the user's attention. The choice of the language used in the status text information element is at the discretion of the MMS service provider.

8.1.4.4 Information Elements

Table 12: Information elements in the MM1_forward.REQ.

Information element	Presence	Description
Recipient address	Mandatory	The address of the recipient of the forwarded MM. Multiple addresses are possible.
Forwarding address	Optional	The address of the forwarding MMS User Agent.
Date and time	Optional	The time and date of the forwarding of the MM.
Time of Expiry	Optional	The desired time of expiry for the forwarded MM.
Earliest delivery time	Optional	The earliest desired time of delivery of the MM to the recipient.
Delivery report	Optional	A request for delivery report for the forwarded MM.
Read reply	Optional	A request for read reply report.
Message Reference	Mandatory	A reference, e.g., URI, for the MM

Table 13: Information elements in the MM1_forward.RES.

Information element	Presence	Description
Status	Mandatory	The status of the MM Forward request.
Status Text	Optional	Description which qualifies the status of the MM Forward request.
Message ID	Mandatory	The identification of the MM given to an accepted MM.

8.1.5 Delivery Report

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8.4 Technical realisation of MMS on reference point MM4

An MMSE may be able to discover a peer MMSE. This clause defines the interworking between MMS Relay/Servers once the peer systems are aware of each other being an MMSE.

Future releases may elaborate how peer MMSEs discover each other. In the mean time, it is expected that MMS service providers or network operators will develop solutions for their particular needs which may include static tables or other look-up methods.

8.4.1 Routing Forward of a Multimedia Message

This part of MMS service covers the routing forward of an MM from an originator MMS Relay/Server to a recipient MMS Relay/Server of different MMSEs. Involved abstract messages are outlined in Table 19 from type and direction points of view.

Table 19: Abstract messages for forwarding of MM in MMS

Abstract messages	Type	Direction
MM4_forward.REQ	Request	Originator MMS Relay/Server -> recipient MMS Relay/Server
MM4_forward.RES	Response	Recipient MMS Relay/Server -> originator MMS Relay/Server

8.4.1.1 Normal operation

After successful discovery of its peer entity the originator MMS Relay/Server shall route an MM forward to the recipient MMS Relay/Server using the MM4_forward.REQ, which contains MMS control information and the MM content. The recipient MMS Relay/Server shall respond with a MM4_forward.RES, which provides the status of the request if an MM4_forward.RES was requested.

Support for MM4_forward.REQ and MM4_forward.RES is mandatory for the MMS Relay/Server.

8.4.1.2 Abnormal Operation

In this case the recipient MMS Relay/Server shall respond with a MM4_forward.RES, which includes a status that indicates the reason the multimedia message was not accepted, e.g. no subscription, bad address, network not reachable, etc., if an MM4_forward.RES was requested.

8.4.1.3 Features

Addressing: The recipient(s) of a routed forward MM shall be indicated in the addressing-relevant information field(s) of the MM4_forward.REQ. If the addresses of several MM recipients of the MM are associated with a single MMS Relay/Server then more than one MM recipient may be indicated in the addressing-relevant information field(s) of the MM4_forward.REQ. Addresses of all MM recipients of the MM (including those that are not associated with the MMS Relay/Server the MM is forwarded to) shall be conveyed in the MM4_forward.REQ for the MM recipient's informational purposes.

The MM originator of a routed forward MM shall be indicated in addressing-relevant information field(s) of the MM4_forward.REQ. If the originator MMS User Agent requested to hide its identity from the MM recipient then the information about this request shall also be conveyed in the MM4_forward.REQ.

Time stamping: The MM4_forward.REQ shall carry the date and time ~~stamp associated with the MM.~~ of the most recent handling of the MM by an MMS User Agent (i.e. either submission or forwarding of the MM). In the case of forwarding the MM4_forward.REQ may carry the date and time of the submission of the MM

Time constraints: If the originator MMS User Agent requested a time of expiry for the MM then this information shall be conveyed in the MM4_forward.REQ.

Message class, priority and subject: If the MM is qualified further by message class, priority, subject and/or additional qualifiers then this information shall be conveyed in the MM4_forward.REQ.

Reporting: If the originator MMS User Agent requested a delivery report for the MM then the information about this request shall be conveyed in the MM4_forward.REQ. If, in addition, the originator MMS User Agent requested a read-reply report then the information about this request shall be conveyed in the MM4_forward.REQ.

Identification: The originator MMS Relay/Server shall always provide a unique message identification for an MM, which it routed forward to a peer MMS Relay/Server in the MM4_forward.REQ.

Content Type: The type of the multimedia content shall always be identified in the MM4_forward.REQ.

Acknowledgement Request: The originator MMS Relay/Server may request a MM4_forward.RES from the recipient MMS Relay/Server acknowledging the successful reception of the MM.

Request Status: The recipient MMS Relay/Server shall indicate the status of the MM4_forward.REQ in the associated MM4_forward.RES if requested.

Message Type: The type of message used on reference point MM4 indicating MM4_forward.REQ and MM4_forward.RES as such.

Transaction Identification: If the originator MMS Relay/Server requests an MM4_forward.RES from the recipient MMS Relay/Server it shall provide a transaction identification within an MM4_forward.REQ. The MM4_forward.RES shall unambiguously refer to the corresponding MM4_forward.REQ using the same transaction identification.

Forward_Counter: A Counter indicating the number of times the particular MM was forwarded.

~~**Forwarded_by:** The address of the forwarding MMS User Agent. Multiple addresses are possible. In the multiple address case this is a Sequential list of the address(es) of the forwarding MMS User Agents who forwarded the same MM.~~

Previously-sent-by: The address(es) of the MMS User Agent(s) that submitted or forwarded the MM prior to the last forwarding MMS User Agent. In the multiple forwarding case the order of the provided addresses shall be indicated and the address of the originator MMS User Agent shall be marked, if present.

Note: The address of the last forwarding MMS User Agent is carried in other addressing elements.

Version: The MMS protocol shall provide unique means to identify the current version in the particular protocol environment.

8.4.1.4 Information Elements

Table 20: Information elements in the MM4_forward.REQ.

Information element	Presence	Description
3GPP MMS Version	Mandatory	The MMS version of the originator MMS Relay/Server as defined by the present document.
Message Type	Mandatory	The type of message used on reference point MM4: "MM4_forward.REQ".
Transaction ID	Mandatory	The identification of the MM4_forward.REQ/ MM4_forward.RES pair.
Message ID	Mandatory	The identification of the MM.
Recipient(s) address	Mandatory	The address(es) of the MM recipient(s). Multiple addresses are possible.
Sender address	Mandatory	The address of the MMS User Agent that most recently handled the MM, i.e. that either submitted or forwarded the MM. If the originator MMS User Agent has requested her address to be hidden from the recipient her address shall not be provided to the recipient.~~The address of the MM originator.~~
Content type	Mandatory	The content type of the MM's content.
Message class	Conditional	The class of the MM (e.g., personal, advertisement, information service) if specified by the originator MMS User Agent
Date and time	Mandatory	The time and date of the most recent handling (i.e. either submission or forwarding) of the MM by an MMS User Agent.~~submission of the Mm (time stamp) or the time and date of the forwarding of the MM..~~
Time of Expiry	Conditional	The desired time of expiry for the MM if specified by the originator MMS User Agent.
Delivery report	Conditional	A request for delivery report if the originator MMS User Agent has requested a delivery report for the MM.
Priority	Conditional	The priority (importance) of the message if specified by the originator MMS User Agent.
Sender visibility	Conditional	A request to show or hide the sender's identity when the message is delivered to the MM recipient if the originator MMS User Agent has requested her address to be hidden from the recipient.
Read reply	Conditional	A request for read reply report if the originator MMS User Agent has requested a read-reply report for the MM..
Subject	Conditional	The title of the whole MM if specified by the originator MMS User Agent.
Acknowledgement Request	Optional	Request for MM4_forward.RES
Forward_counter	Conditional	A counter indicating the number of times the particular MM was forwarded.
Previously-sent-by~~Forwarded_by~~	Optional~~Conditional~~	In case of forwarding this information element contains one or more address(es) of MMS User Agent(s) that handled (i.e. forwarded or submitted) the MM prior to the MMS User Agent whose address is contained in the Sender address information element. The order of the addresses provided shall be marked. The address of the originator MMS User Agent shall be marked, if present.~~The address of the forwarding MMS User Agent. Multiple addresses are possible. In the multiple address case this is a Sequential list of the address(es) of the forwarding MMS User Agents who forwarded the same MM.~~
Previously-sent-date-and-time	Optional	The date(s) and time(s) associated with submission and forwarding event(s) prior to the last handling of the MM by an MMS User Agent.
Content	Conditional	The unaltered content of the multimedia message if specified by the originator MMS User Agent.

Table 21: Information elements in the MM4_forward.RES.

Information element	Presence	Description
3GPP MMS Version	Mandatory	The MMS version of the recipient MMS Relay/Server as defined by the present document.
Message Type	Mandatory	The type of message used on reference point MM4: “MM4_forward.RES”.
Transaction ID	Mandatory	The identification of the MM4_forward.REQ/ MM4_forward.RES pair.
Message ID	Mandatory	The Message ID of the MM which has been forwarded within the corresponding MM4_forward.REQ
Request Status Code	Mandatory	The status of the request to route forward the MM.
Status text	Optional	Status text corresponding to the code

8.4.2 Routing Forward of a Delivery Report

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8.4.4 Message format on MM4

All elements of an MM shall be included within a single SMTP "mail" message which shall be organised as MIME type application/multipart. All MM elements shall be of standard MIME content types. In addition to the MM elements this SMTP "mail" message should reflect all MMS information elements according to the definitions in clauses 6 and 8.4.

All other MMS-related messages, such as delivery reports, read-reply reports, transfer acknowledgements shall each be transferred as a single SMTP "mail" message which shall be organised as MIME type text/plain. This SMTP "mail" message should reflect all MMS information elements as defined above.

8.4.4.1 Message header fields

MMS information elements should be reflected as "header fields" according to STD 11 in the SMTP "mail" message. See RFC 1327 [53] for a detailed description of the X.400 header to STD 11 headers mappings. Some of the mappings are context dependent.

For those information elements that cannot be mapped to standard STD 11 "header fields" the "X-" extensions mechanism shall be used with an "X-MMS-" prefix.

The mapping of information elements to commonly used (RFC 1327) [53] or standard STD 11 "header fields" is shown in following tables.

8.4.4.2 MM4_Forward.REQ Header Mappings

The MM4 Forward request header mappings are detailed below.

Table 28: MM4_Forward.REQ Information Elements to STD 11 Header Mappings

Information element	STD 11 Headers
3GPP MMS Version	X-Mms-3GPP-MMS-Version:
Message Type	X-Mms-Message-Type:
Transaction ID	X-Mms-Transaction-ID:
Message ID	X-Mms-Message-ID:
Recipient(s) address	To:, CC:
Sender address	From:
Content type	Content-Type:
Message class	X-Mms-Message-Class:
Date and time	Date:
Time of Expiry	X-Mms-Expiry:
Delivery report	X-Mms-Delivery-Report:
Priority	X-Mms-Priority:
Sender visibility	X-Mms-Sender-Visibility:
Read reply	X-Mms-Read-Reply:
Subject	Subject:
Acknowledgement Request	X-Mms-Ack-Request:
Forward counter	X-Mms-Forward-Counter:
Previously-sent-by	X-Mms-Previously-sent-by:
Previously-sent-date and-time	X-Mms-Previously-sent-date-and-time:
Content	*<message body>*
-	Sender:
-	X-Mms-Originator-System:
-	Message-ID:

The table above indicates the mappings from MM4_Forward.REQ information elements to the corresponding STD 11 headers.

The MM Message-ID is not directly mapped to a corresponding STD 11 [5] "Message-ID:" header. Each STD 11 message must have a unique message id, which is carried in the "Message-ID:" header.

Content-type maps directly since both are defined as being MIME content types as specified in RFC 2046 [6].

The STD 11 "From:" header is determined by the mail user agent, or, in this case, the MMS User Agent. This corresponds to the MM "Sender address", as set by the MMS User Agent or MMS Relay/Server.

STD 11 messages are required to have a Sender: header that indicates the originator address (as determined by the SMTP "MAIL From" command).

The STD 11 “X-Mms-Originator-System:” header shall be used to indicate the address that the recipient MMS Relay/Server shall use as the recipient address with MM4_Forward.RES.

8.4.4.3 MM4_Forward.RES Header Mappings

The MM4 Forward response information element mappings are detailed in the table below.

The transmission of the Forward Response from the recipient MMS Relay/Server requires a properly addressed STD 11 message. While the addressing of the MM4_Forward.REQ is clearly that of the intended recipients and originator, the MM4_Forward.RES addressing is related to neither the recipients nor the originator of the original MM. Instead, the MM4_Forward.RES addressing is based on special systems addresses. MMS Service Provider should configure appropriate system addresses which will be used as both the recipient and originator of these administrative messages. It is suggested that the administrative addressing be based on the pattern:

system-user@mms-relay-host.mmse-domain.

The STD 11 “To:” header value shall be according to the STD 11 “X-Mms-Originator-System:” header value provided in MM4_Forward.REQ.

Table 29: MM4_Forward.RES Information Elements to STD 11 Header Mappings

Information element	STD 11 Header
3GPP MMS Version	X-Mms-3GPP-MMS-Version:
Message Type	X-Mms-Message-Type:
Transaction ID	X-Mms-Transaction-ID:
Message ID	X-Mms-Message-ID:
Request Status Code	X-Mms-Request-Status-Code:
Status text	X-Mms-Status-Text:
-	Sender:
-	To:
-	Message-ID:
-	Date:

The Sender: and To: headers contain system addresses as described above, and do not map to MM4_Forward.RES information elements. The STD 11 message requires a Date: header, but there currently is no corresponding MM4_Forward.RES information element.

8.4.4.4 MM4_Delivery_report.REQ Header Mappings

The mappings of the MM4_Delivery_report.REQ information elements to STD 11 headers is detailed in the table below.

Table 30: MM4_Delivery_report.REQ Information Elements to STD 11 Header Mappings

Information element	STD 11 Header
3GPP MMS Version	X-Mms-3GPP-MMS-Version:
Message Type	X-Mms-Message-Type:
Transaction ID	X-Mms-Transaction-ID:
MM Message ID	X-Mms-Message-ID:
Recipient address	From:
Sender address	To:
MM Date and time	Date:
Acknowledgement Request	X-Mms-Ack-Request:
MM Status Code	X-Mms-MM-Status-Code:
Status Text	X-Mms-Status-text:
-	Sender:
-	Message-ID:

The meaning of Recipient address is that of the original MM, from whose MMS User Agent this Delivery-report is being generated. The meaning of Sender address is that of the original MM, to whom the Delivery-report is being sent.

The value of the STD 11 Sender: header is a system administration address, to which the corresponding response will be sent.

The Sender: header value is automatically set to the system address of the MMS Relay/Server.

The Message-ID: value is automatically generated by the MMS Relay/Server, in conformance to STD 11 [5].

The other header mappings from information elements are similar to those already described above.

8.4.4.5 MM4_Delivery_report.RES Header Mappings

The mappings of the M4_Delivery_report.RES information elements to STD 11 headers is detailed in the table below.

Table 31: MM4_Delivery_report.RES Information Elements to STD 11 Header Mappings

Information element	STD 11 Header
3GPP MMS Version	X-Mms-3GPP-MMS-Version:
MM Message Type	X-Mms-Message-Type:
Transaction ID	X-Mms-Transaction-ID:
Message ID	X-Mms-Message-ID:
Request Status Code	X-Mms-Request-Status-Code:
Status text	X-Mms-Status-Text:
-	Sender:
-	To:
-	Message-ID:
-	Date:

The Sender: header value is automatically set to the system address of the MMS Relay/Server that is replying to the MM4_Delivery_report.REQ.

The To: header value of the MM4_Delivery_report.RES abstract message is obtained from the Sender: header value of the corresponding MM4_Delivery_report.REQ.

The Date and Message-ID headers, which have no corresponding MM4_Forward.RES information attributes, are automatically provided values by the MMS Relay/Server.

8.4.4.6 MM4_Read_reply_report.REQ Header Mappings

The mappings of the MM4_Read_reply_report.REQ information elements to STD 11 headers is detailed in the table below.

Table 32: MM4_Read_reply_report.REQ Information Elements to STD 11 Header Mappings

Information element	STD 11 Header
3GPP MMS Version	X-Mms-3GPP-MMS-Version:
Message Type	X-Mms-Message-Type:
Transaction ID	X-Mms-Transaction-ID:
Recipient address	From:
Sender address	To:
Message-ID	X-Mms-Message-ID:
Date and time	Date:
Acknowledgement Request	X-Mms-Ack-Request:
Read Status	X-Mms-Read-Status:
Status text	X-Mms-Status-Text:
-	Sender:
-	Message-ID:
-	Date:

The meaning of Recipient address is that of the original MM, from whose MMS User Agent this Read-reply-report is being generated. The meaning of Sender address is that of the original MM, to whom the Read-reply-report is being sent.

The value of the Sender: header is a system address, to which the corresponding MM4_Read_reply_report.RES shall be sent.

The Message-ID:, and Date: headers, which have no corresponding information attribute in the MM4_Read_reply_report.REQ, are automatically provided appropriate values by the MMS Relay/Server.

8.4.4.7 MM4_Read_reply_report.RES Header Mappings

The mappings of the MM4_Read_reply_report.RES information elements to STD 11 headers is detailed in the table below.

Table 33: MM4_Read_reply_report.RES Information Elements to STD 11 Header Mappings

Information element	STD 11 Header
3GPP MMS Version	X-Mms-3GPP-MMS-Version:
MM Message Type	X-Mms-Message-Type:
Transaction ID	X-Mms-Transaction-ID:
Request Status Code	X-Mms-Request-Status-Code:
Status text	X-Mms-Status-Text:
-	Sender:
-	To:
-	Message-ID:
-	Date:

The Sender: header value shall be the system address of the MMS Relay/Server that is replying to the MM4_Delivery_report.REQ.

The To: header value of the MM4_Delivery_report.RES abstract message shall be obtained from the corresponding MM4_Delivery_report.REQ Sender: header value.

The Date: and Message-ID: headers, which do not have corresponding information elements, shall be provided appropriate values automatically by the MMS Server/Relay.

8.4.4.8 Header Field Value Range

MMS information elements that are mapped to standard STD 11 "header fields", i.e. which do not have an "X-Mms~~MS~~-" prefix, should be used according to [5].

The rest of the header definitions used in this clause, including the mechanisms and pre-defined tokens, are described in an augmented Backus-Naur Form (BNF) defined in [48], similar to that used by RFC 822 [5]. Implement~~o~~ers will need to be familiar with the notation in order to understand these definitions.

For the residual MMS information elements the following applies:

X-Mms-3GPP-MMS-Version:

```
3GPP-MMS-Version = "X-Mms-3GPP-MMS-Version" ":"  1*DIGIT "." 1*DIGIT "."
1*DIGIT
```

Note that the numbers MUST be treated as separate integers and that each may be incremented higher than a single digit. Thus, 2.1.4 is a lower version than 2.1.13, which in turn is lower than 2.3.0 Leading zeros shall be ignored by recipient MMS Relay/Server and shall NOT be sent. The version is according to the version of the present document (see also clause "Foreword").

X-Mms-Message-Type:

```
Message-type = "X-Mms-Message-Type" ":" ( "MM4_forward.REQ" |
"MM4_forward.RES" | "MM4_delivery_report.REQ" | "MM4_delivery_report.RES" |
"MM4_read_reply_report.REQ" | "MM4_read_reply_report.RES" )
```

X-Mms-Transaction-Id:

```
Transaction-id =  "X-Mms-Transaction-ID" ":" quoted-string
```

X-Mms-Message-Id:

```
Message-id =  "X-Mms-Message-ID" ":" quoted-string
```

X-Mms-Message-Class:

```
Message-class = "X-Mms-Message-Class" ":" ( Class-identifier | quoted-string
)

Class-identifier = "Personal" | "Advertisement" | "Informational" | "Auto"
```

X-Mms-Expiry:

```
Expiry-value = "X-Mms-Expiry" ":" ( HTTP-date | delta-seconds )
```

X-Mms-Delivery-Report:

```
Delivery-report =  "X-Mms-Delivery-Report" ":" ( "Yes" | "No" )
```

X-Mms-Priority:

```
Priority = "X-Mms-Priority" ":" ( "Low" | "Normal" | "High" )
```

X-Mms-Sender-Visibility:

```
Sender-visibility = "X-Mms-Sender-Visibility" ":" ( "Hide" | "Show" )
```

X-Mms-Read-Reply:

```
Read-reply = "X-Mms-Read-Reply" ":" ( "Yes" | "No" )
```

X-Mms-Ack-Request:

```
Ack-Request = "X-Mms-Ack-Request" ":" ( "Yes" | "No" )
```

X-Mms-Request-Status-Code:

```
Request-status-Code =  "X-Mms-Request-Status-Code" ":" ( "Ok" | "Error-
unspecified" | "Error-service-denied" | "Error-message-format-corrupt" |
"Error-sending-address-unresolved" | "Error-message-not-found" | "Error-
network-problem" |   "Error-content-not-accepted" | "Error-unsupported-
message" )
```

X-Mms-MM-Status-Code:

```
MM-Status-Code = "X-Mms-MM-Status-Code" ":" ( "Expired" | "Retrieved" |
"Rejected" | "Deferred" | "Indeterminate" | "Forwarded" | "Unrecognised" )
```

X-Mms-Read-Status:

```
Read-Status = “X-Mms-Read-Status” “:” ( “Read” | “Deleted without being read” )
```

X-Mms-Forward-Counter

```
Forward-Counter = "X-Mms-Forward-Counter" ":" 1*DIGIT
```

X-Mms-Previously-sent-by

```
Previously-sent-by = “X-Mms-Previously-sent-by” “:” 1*DIGIT “,” mailbox
```

The address should be machine-usable, as defined by "mailbox" in RFC 2822 [5].

Note: The number indicates the chronological order of the submission and forwarding event(s). The number “0” is associated with the submission of the MM. A higher number indicates an event at a later point in time.

X-Mms-Previously-sent-date-and-time

```
Previously-sent-date-and-time = “X-Mms-Previously-sent-date-and-time” “:”
1*DIGIT “,” HTTP-date
```

The date should be machine-usable, as defined by "HTTP-date" in RFC 2616 [48].

Note: The number indicates the chronological order of the submission and forwarding events. The number “0” is associated with the submission of the MM. The number indicates the correspondence to the MMS User Agent’s address in the “X-Mms-Previously-sent-by” header field with the same number.

8.4.4.9 Message Encoding on MM4

The SMTP "mail" message shall be encoded according to STD 11 [5].^

. . .

3GPP TSG-T2 #16
Sophia Antipolis, France
11-15 February 2002

T2-020150

CR-Form-v5

CHANGE REQUEST

⌘ **23.140** **CR** **035** ⌘ **rev** **-** ⌘ Current version: **4.5.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Correction on the MIME Content-Type Message format on MM4
Source:	⌘	T2
Work item code:	⌘	MESS5-MMS
Date:	⌘	January 18th, 2002
Category:	⌘	**F**
Release:	⌘	REL-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	This CR corrects the possible MIME type values that can be included in the MM4_forward.REQ.
Summary of change:	⌘	The current spec references a non existent MIME type (application/multipart). The incorrect Content-Type is removed and replaced by the appropriate text.
Consequences if not approved:	⌘	The technical specification contains inaccuracies.

Clauses affected:	⌘	8.4.4
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at:
http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.4.4 Message format on MM4

All elements of an MM shall be included within a single SMTP "mail" message which shall be organised as MIME message with the appropriate 'Content-Type' [44] header field value (e.g. multipart/related, multipart/mixed, image/jpeg, text/plain).~~type application/multipart.~~ All MM elements shall be of standard MIME content types. In addition to the MM elements this SMTP "mail" message should reflect all MMS information elements according to the definitions in clauses 6 and 8.4.

All other MMS-related messages, such as delivery reports, read-reply reports, transfer acknowledgements shall each be transferred as a single SMTP "mail" message which shall be organised as MIME type text/plain. This SMTP "mail" message should reflect all MMS information elements as defined above.