

Source: **T2**

Agenda item: **7.3**

Presentation of Specification to TSG or WG

Presentation to: TSG T Meeting #6

Document for presentation: TS 23.140, Version 1.0.0

Presented for: Information

Abstract of document:

SMS has been very successful in the GSM second generation system, as all mobiles have supported the application level. This easy to use service for non real-time text transmission between GSM users shall be succeeded to in third generation mobile systems by a non real-time Multimedia Message Service, MMS.

MMS is a new service to overcome the SMS-inherent limitations e.g. text-only messaging and limited message size together with the integration of other messaging services e.g. known from the Internet world. The MMS will allow users to send and receive messages exploiting the whole array of media types. This Specification defines the description of the non real-time MMS, by identifying the functional capabilities and information flows needed to support the service. In order to allow early introduction and fast acceptance of MMS, the aim for Release 99 of this service is to provide messaging facilities with low implications on their implementation complexity.

Interrelation with other documents:

- 3G TS 22.140: "Multimedia Messaging Service, Stage 1"
 - 3G TS 23.057: "Mobile Station Application Execution Environment, Stage 2"
-

Outstanding Issues:

- identify a minimum set of supported media formats,
- MMS addressing scheme (based on MSISDN and Email),
- interface between the MMS Relay and the MMS Server,
- interworking between different MMS Relays,
- availability and changes of the state of availability of the MMS User Agent.

Completion of the above mentioned issues is expected due March 2000.

Contentious Issues: None

Work Area / Item:		MMS (Multimedia Messaging Service)			
Affects:	UE/MS: X	CN: X	UTRAN:	Compatibility Issues: Yes: X No:	
Expected Completion Date:		March 2000			
Services impacted:		MMS			
Specifications affected:		3G TS 23.140			
Tasks within work which are not complete:			<ul style="list-style-type: none"> - Set of supported media formats - MMS addressing scheme - Interface: MMS Relay – MMS Server - Interworking between MMS Relays - Availability of the MMS User Agent 		
Consequences if not included in Release 1999:			<p>Early introduction and fast acceptance of MMS almost impossible;</p> <p>Inclusion in Release 99 is requested e.g. from SERG#36</p>		
Accepted by TSG#		for late inclusion in Release 1999:			

3G TS 23.140 V1.0.0 (1999-12)

Technical Specification

**3rd Generation Partnership Project;
Technical Specification Group Terminals;
Multimedia Messaging Service (MMS);
Functional description;
Stage 2
(3G TS 23.140 version 1.0.0)**



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Contents

Contents	3
Foreword	5
Introduction.....	5
1 Scope	5
2 References	6
3 Definitions and abbreviations.....	6
3.1 Definitions	6
3.2 Abbreviations.....	6
4 General Architecture	8
4.1 Overview.....	8
4.2 Involved MMS Elements	9
4.3 Involved MMSE Interfaces.....	10
5 Protocol Framework	11
5.1 Addressing	11
6 Functional Description of Involved MMS Elements.....	11
6.1 Terminal (MMS User Agent).....	11
6.2 MMS Server.....	12
6.3 MMS Relay.....	12
6.4 MMS Subscription database	13
6.5 MMS User Profile Database	13
6.6 Media Type Converters.....	13
6.7 HLR	13
6.8 "Foreign" MMS Relay	13
7 MMSE Interfaces.....	13
7.1 MMS Relay – MMS User Agent.....	13
7.2 MMS Relay – MMS Server	13
7.3 MMS Relay – MMS Subscription Database	13
7.4 MMS Relay – MMS Profile Database	14
7.5 MMS Relay – HLR.....	14
7.6 Interworking of different MMS-Relays.....	14
8 WAP implementation of MMS.....	14
8.1 MMS Session.....	14
8.2 Terminal CAPABILITY NEGOTIATION	15
8.3 Protocol Operations	15
8.3.1 MMS Origination	15
8.3.2 MMS Push Delivery.....	16
8.3.3 MMS Query.....	17
8.3.4 MMS Pull Delivery	17
8.3.5 MMS Delivery Report.....	17
8.3.6 MMS User Profile Management.....	17
8.4 MMS Message Contents	17
8.4.1 MMS Message Encapsulation	17
8.4.2 Other messages.....	17
8.4.3 MMS Presentation.....	17
8.5 MMS Security Model between MMS user agent and MMS relay	18
8.5.1 Delivery of Multimedia Messages.....	18
8.5.2 Retrieval of Multimedia Messages	18
8.5.3 Delivery Report.....	18

Annex A (Informative):	Simplified information flows	19
1.	Terminal originated flows	19
2.	Terminal terminated flows	22
3.	Failure Handling	23
History		26

Foreword

This Technical Specification has been produced by the 3GPP.

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of this TR, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 Indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the specification;

Introduction

1 Scope

This 3GPP Technical Specification defines the stage 2 and stage 3 description of the non realtime Multimedia Messaging Service, MMS. Stage 2 identifies the functional capabilities and information flows needed to support the service described in stage 1.

This TS includes information applicable to network operators, service providers and terminal, switch and database manufacturers.

This TS contains the core functions for a non realtime Multimedia Messaging Service, MMS, which are sufficient to provide a complete service.

MMS uses a number of technologies to realise the requirements of the stage 1 description (3G TS 22.140). This TS describes how the service requirements are realised with the selected technologies. As far as possible existing protocols (e.g. WAP, SMTP, ESMTP as transfer protocols; lower layers to provide push, pull, notification) and existing message formats (e.g. SMIL, MIME) shall be used for the realisation of the Multimedia Messaging Service.

This TS contains lists of elements and interfaces involved in the Multimedia Messaging Service Environment. These lists are subject to the finalisation of MMS Stage 1 (3G TS 22.140). All items that will be identified as being outside the scope of standardisation shall be discarded according to a stable version of 3G TS 22.140 to come. This also applies to the corresponding chapters, sections and subsections.

Editor's note: The paragraph above may be deleted after this TS is adapted to a stable version of 3G TS 22.140.

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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] 3G TS 22.101: "Service Principles"
- [2] 3G TS 22.121: "The Virtual home Environment"
- [3] 3G TS 22.140: "Multimedia Messaging Service"
- [4] 3G TS 23.057: "Mobile Station Application Execution Environment"
- [5] "Wireless Application Environment Specification", WAP Forum, April 30th, 1998. URL: <http://www.wapforum.org/>
- [6] "Wireless Session Protocol", WAP Forum, April 30, 1998. URL: <http://www.wapforum.org/>
- [7] "Hypertext Transfer Protocol - HTTP/1.1", R. Fielding, et al., January 1997. URL: <ftp://ftp.isi.edu/in-notes/rfc2068.txt>
- [8] Synchronized Multimedia Integration Language (SMIL) 1.0 Specification - <http://www.w3.org/TR/1998/REC-smil-19980615/>
- [9] "Service Indication", WAP Forum, November 8th, 1999. URL: <http://www.wapforum.org>
- [10] User Agent Profile", WAP Forum, November 10th, 1999. URL: <http://www.wapforum.org>

3 Definitions and abbreviations

3.1 Definitions

3.2 Abbreviations

For the purposes of this document the following abbreviations apply in addition to those defined in [3]:

MIME	Multipurpose Internet Mail Extensions
MM	Multimedia Message
MMSE	Multimedia Message Service Environment
MMS	Multimedia Messaging Service

PDU	Protocol Data Unit
SMIL	Synchronized Multimedia Integration Language
WAP	Wireless Application Protocol
WSP	WAP Session Protocol

4 General Architecture

4.1 Overview

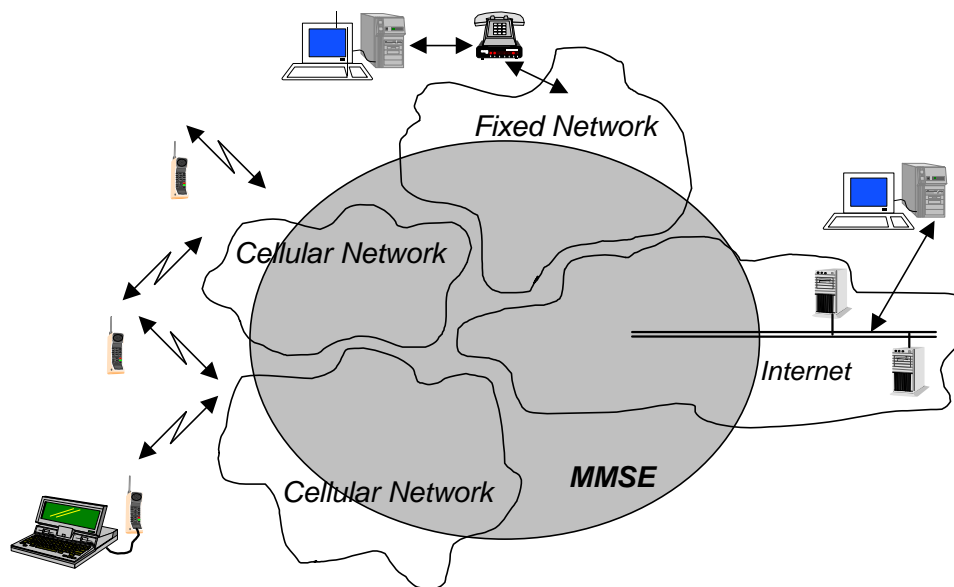


Figure 1: General view of MMS provision within the different networks

Figure 1 shows a generalised view of the Multimedia Message Service architecture for a third generation messaging system. It shall combine different networks and network types and shall integrate messaging systems already existent within these networks. The terminal operates with the Multimedia Messaging Service Environment, MMSE. This environment may comprise 2G and 3G networks, 3G networks with islands of coverage within a 2G network and roamed networks. The MMSE provides all the necessary service elements, e.g. delivery, storage and notification functionality. These service elements could be located within one network or distributed across several networks or network types.

4.2 Involved MMS Elements

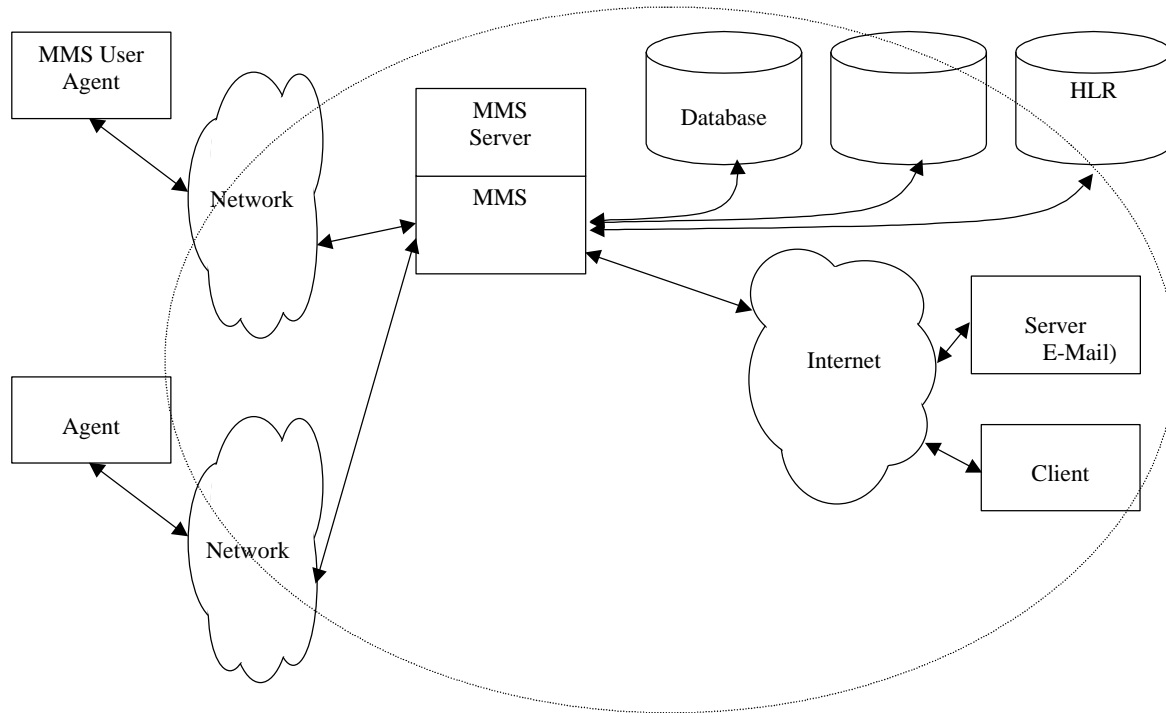


Figure 2 : MMS Architecture Overview

- MMS User Agent
- MMS Relay
- MMS Server
- MMS Subscription Database
- MMS Profile Database
- Media Type Converters
- HLR
- “Foreign” MMS Relay/Server

4.3 Involved MMSE Interfaces

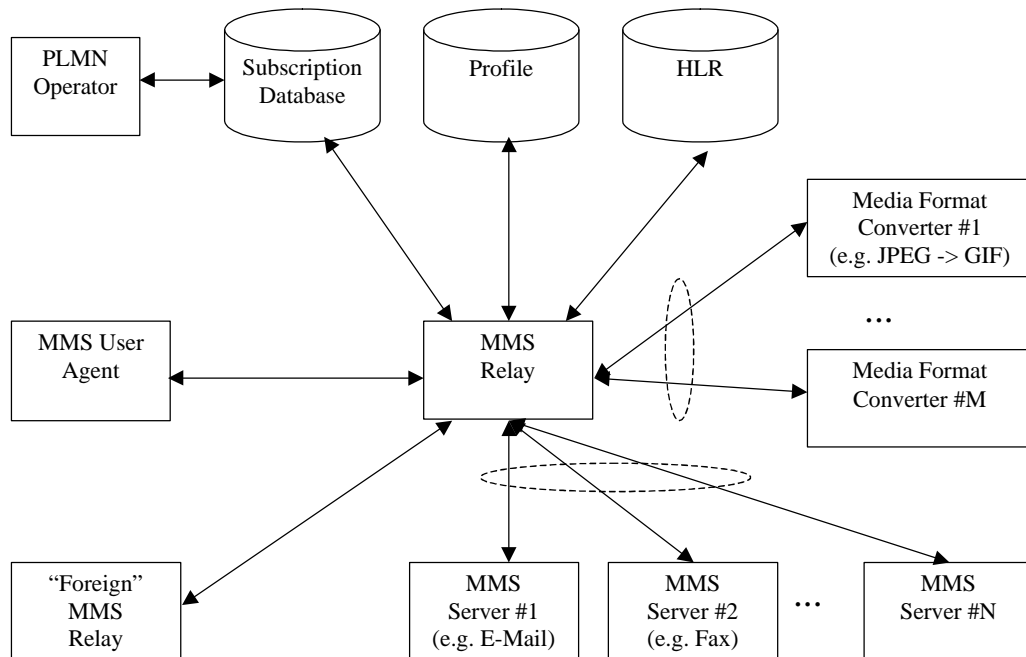


Figure 3 : MMSE Interfaces

- MMS Relay – MMS User Agent
- MMS Relay – MMS Server
- MMS Relay – MMS Subscription Database
- MMS Relay – MMS Profile Database
- MMS Relay – HLR
- MMS Relay – Media Type Converter
- MMS Subscription Database – Operator
- “Home” MMS-Relay – “Foreign” MMS-Relay

5 Protocol Framework

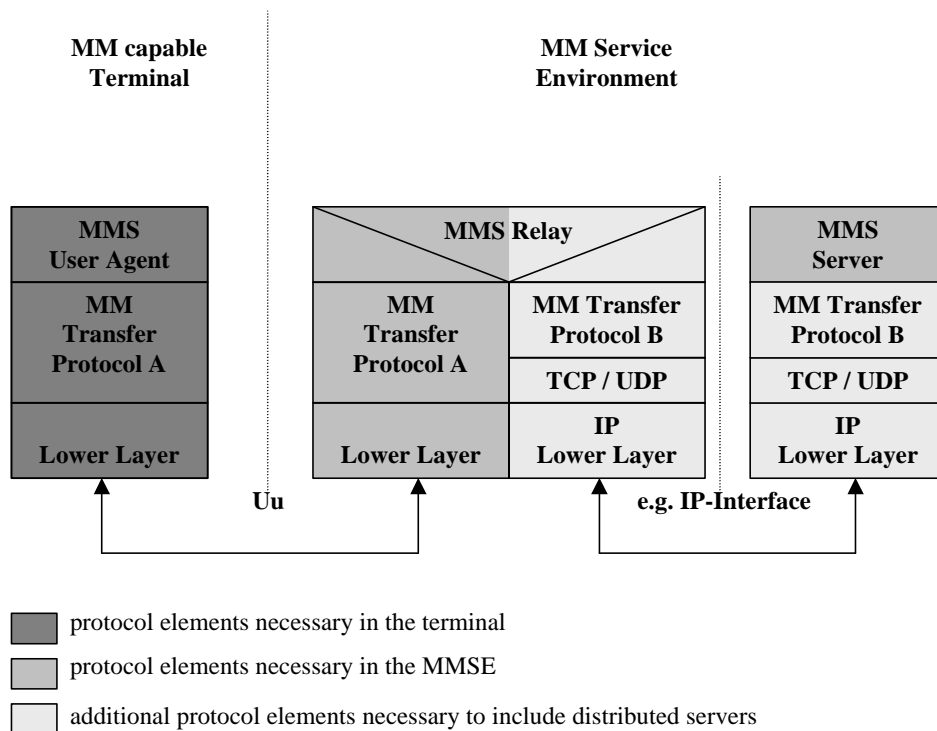


Figure 4: Protocol Framework to provide MMS

To provide implementation flexibility, integration of existing and new services together with interoperability across different networks and terminals, the MMS shall make use of the protocol framework outlined in Figure 4. In this framework the MMS User agent communicates through the MMS Relay with the MMS Server. This MMS Relay shall provide convergence functionality between server and MMS user agent and thus enabling the integration of different server types across different networks. It should be possible to combine Server and Relay functionality.

The MM transfer protocol A shall be implemented using MExE [4] (e.g. Java and TCP/IP) or WAP [5]. For the implementation of MExE Classmark 1 and WAP refer to section 8. Implementations based on other MExE Classmarks are for future releases.

5.1 Addressing

MMS shall support the use of either E-Mail addresses (RFC 822) or MSISDN. In the case of E-Mail addresses standard internet message routing could be used.

Editors note: The use of E-Mail and MSISDN addressing schemes in combination needs further study

6 Functional Description of Involved MMS Elements

6.1 Terminal (MMS User Agent)

- MM composition
- MM presentation
- de- and encryption / signing
- presenting notifications to the user
- all aspects of storing MMs on the terminal and/or USIM

- handling of external devices
- user profile management
- retrieval of MMs (initiate MM delivery to the terminal)

In order to guarantee a minimum support and compatibility between multimedia terminals, there shall be the following multimedia formats to be agreed.

Minimum set of supported formats could be for example text and:

- Baseline JPEG (Joint Photographic Expert Group)
- Internet Media Type (mime): image/jpeg
- GIF 87, GIF 89a (Graphics Interchange Format)
- Internet Media Type (mime): image/gif

In addition to these, some recommendations to the image sizes may be required to ensure bandwidth efficiency.

Editors note: this list has to be agreed

6.2 MMS Server

- MMSE element which is responsible for storing messages.
- different Servers can be included, e.g. MMS-Server, E-Mail Server, SMS Server (SMSC), Fax, etc.

6.3 MMS Relay

This MMS Relay shall provide convergence functionality between server and user agent and thus enabling the integration of different server types across different networks. It should be possible to combine Server and Relay functionality.

MMSE element which is responsible for the following functions:-

- receive and send MM
- enable/disable MMS function
- personalised multimedia messaging
- MM deletion
- media type conversion
- media format conversion
- message content retrieval
- MM forwarding
- screening of MM

additional functionality not provided by standard servers and transfer protocols

- negotiate terminal capabilities
- terminal availability
- MMS personalisation
- terminal notification

- charging

6.4 MMS Subscription database

- maintain user subscription information
- controls access to the MMS
- controls the extent of available service capability (e.g. server storage space)

6.5 MMS User Profile Database

- set of rules how to handle incoming messages and there delivery
- current capabilities of the users terminal

Editors note: the location of the profile has to be defined

6.6 Media Type Converters

- ffs

6.7 HLR

- inform the MMS about availability and changes in the state of availability of the User Agent
- ffs

6.8 “Foreign” MMS Relay

- ffs

7 MMSE Interfaces

7.1 MMS Relay – MMS User Agent

This interface shall be implemented using MExE [4] (e.g. Java and TCP/IP) or WAP [5]. For the implementation of MExE Classmark 1 and WAP refer to section 8. Implementations based on other MExE Classmarks are for future releases.

7.2 MMS Relay – MMS Server

This interface shall be standardised and is within the scope of this specification and will be based upon existing standards e.g. IP, SMTP.

Where the MMS-Relay and MMS-Server are wholly integrated then the interface is outside the scope of the specification.

7.3 MMS Relay – MMS Subscription Database

This interface is outside the scope of this specification.

7.4 MMS Relay – MMS Profile Database

This interface is outside the scope of this specification.

7.5 MMS Relay – HLR

In case the MMS-Relay – HLR interface is needed for provisioning the MMS then the protocol is MAP/SS7.

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

This interface may be used for alerting functionality to the MMS-Relay..

7.6 Interworking of different MMS-Relays

This interface shall be standardised and is within the scope of this specification and will be based upon existing standards e.g. IP, SMTP.

8 WAP implementation of MMS

8.1 MMS Session

WAP WSP connection-oriented session is used for delivery of multimedia messages, retrieval of multimedia messages, MM query, user profile settings etc.

Figure 5 presents the operation of the WAP session. During establishment phase, capability negotiation is performed. After the connection (as well as in parallel) a method is invoked in a MMS relay which allows, in the case of MMS, the delivery and retrieval of the user data. The POST method is used to deliver data and the GET method is used to retrieve data. The MMS relay responds the method invocation by either delivering the requested data or responding to a delivered data.

Editors note: this paragraph has to be rephrased

The method invocation may be done multiple times asynchronously, based on the application protocol model. Figure 6 presents the disconnection of the session. This model is adopted directly from the HTTP/1.1 specifications in [7].

Editors note: this paragraph has to be rephrased

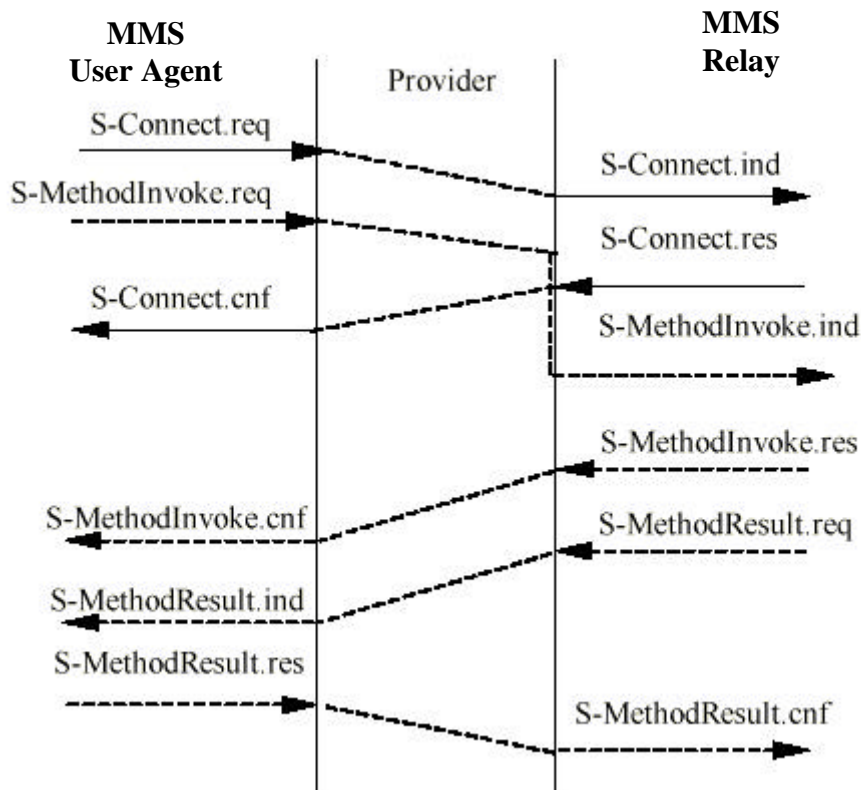


Figure 5 :The establishment and use of WAP session [6]

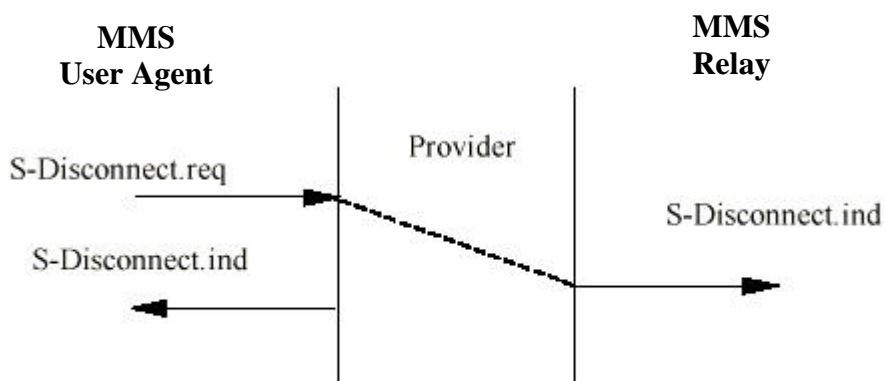


Figure 6 : The disconnection of WAP session [6]

8.2 Terminal CAPABILITY NEGOTIATION

The capability negotiation between the terminal and the MMS relay is done while the WAP session is being established, relying on the WAP UAPProf mechanism [10]. Basically, the terminal indicates the supported MIME types and the maximum message size it supports.

The MMS relay does not deliver those media objects that are not supported by the terminal.

8.3 Protocol Operations

8.3.1 MMS Origination

The multimedia messaging delivery is done by invoking the POST-method in the MMS relay over the connection-

oriented WAP. The user data contains the multimedia message. The status in the reply PDU within the response indicates whether the delivery of the message to another MMS relay is successful, or whether was some failure, for instance, addressing problem.

The error cases in a WAP session are handled by the WSP itself. A session failure indicates an undelivered (and not charged) message.

8.3.2 MMS Push Delivery

The push delivery of the multimedia message is two-phased. First, a multimedia message notification is delivered to the user agent. This is realised with the WAP Push technique which allows the MMS relay to push content to the MMS user agent. The data in the push does not, however, contain the message itself, but some preliminary information of the message (size, media types of the multimedia objects etc).

In Figure 7 and Figure 8 there are the arrow-diagrams of the non-confirmed and confirmed push mechanisms. Sending notifications to terminals can be simply performed by using SMS as a WAP Push bearer. In this way, the MMS relay does not need to be concerned with determining if a notification can be sent in the case that the terminal is not reachable.

In the case where SMS is used as a WAP Push bearer for multiple notifications these will be sent by using a single short message that may be concatenated.

When the terminal receives the notification, it automatically retrieves the multimedia message, based on its capabilities. In this retrieval, the GET method is invoked in the MMS relay over a connection-oriented WAP session.

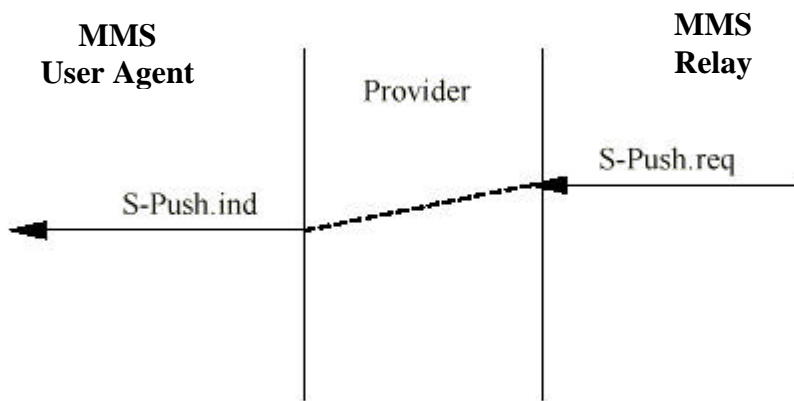


Figure 7 : The non-confirmed data push [6]

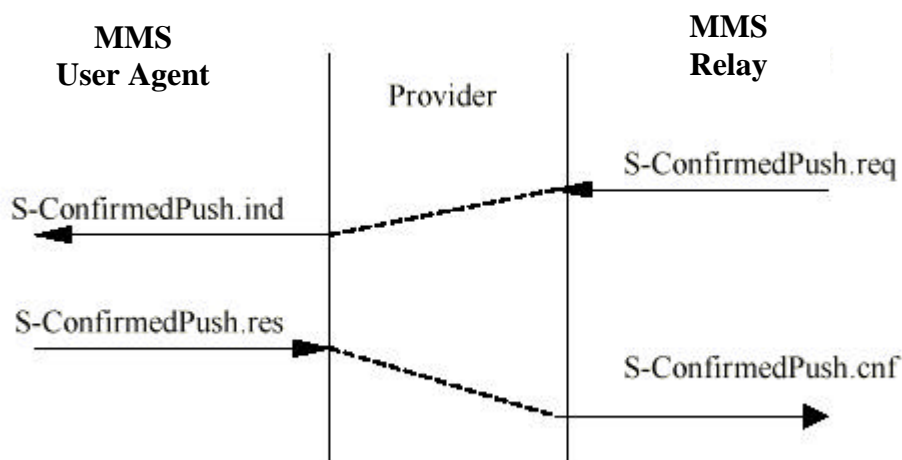


Figure 8 : The confirmed data push [6]

8.3.3 MMS Query

The MMS query operation is used to retrieve information of the existing multimedia messages in the MMS relay. The query operation retrieves all the multimedia message notifications from the MMS relay and then allows the user to retrieve the messages.

The MMS query operation uses GET method over connection-oriented WAP session. In the reply, there are one or more multimedia message notifications.

8.3.4 MMS Pull Delivery

In this case a notification is sent to the user agent, but there is no automatic delivery of multimedia message. The user may then retrieve the message using the GET method.

8.3.5 MMS Delivery Report

The MMS delivery report is a report to the sender of the multimedia message indicating the status of the delivery to the recipient. Typical status indications could be: received, rejected, expired, etc.

Technically, the MMS delivery report is realised using connectionless Push and SMS as push bearer.

8.3.6 MMS User Profile Management

The user profile management is done using POST method over connection-oriented WAP session.

Editors note: A set of PDUs needs to be defined for the operations.

8.4 MMS Message Contents

8.4.1 MMS Message Encapsulation

The MIME multipart technique is standard Internet technique to combine the email body and the attachments together. The WAP has a binary equivalent to this, referenced in [6] which can be used to combine multimedia objects in the multimedia messages together.

The use of the WAP binary multipart structure allows easy conversion between binary format and the Internet MIME multipart. In addition, the binary format allows efficient handling of the message especially in cases when some multimedia objects must be taken out of the structure.

In the multipart structure each multimedia object is a single part. In addition, the MMS presentation information is also found in one or more parts.

Editors note: The MMS –related headers are either one part in the multipart or in WSP headers using application specific codepage technique.

8.4.2 Other messages

The other messages for which PDUs needs to be defined include multimedia message notification, delivery reports, MMS query and the profile management.

Editors note: The multimedia messaging notification may use the basic functionality from the WAP Service Indication model [9]. Service indication model needs to be extended

8.4.3 MMS Presentation

The concept of MMS presentation means the layout, sequencing and timing of multimedia objects on the terminal screen and other devices such as speaker. In order to provide a future-proof ability to present multimedia slide-shows the Synchronised Multimedia Integration Language (SMIL) [8] shall be used.

The Synchronised Multimedia Integration Language (SMIL) [8] is a well-known W3C effort for synchronised multimedia. It provides the necessary layout, sequencing and timing tools for the multimedia presentations. Figure 9 presents an example of SMIL having a single image and text parts.

Editors note: for the first phase of MMS the full features of SMIL may not be needed.

Editors note: for WAP transfer, a binary encoding for SMIL needs to be defined.

```
<smil>
  <head>
    <layout>
      <root-layout width="160" height="160"/>
      <region id="up" width="160" height="20" left="0" top="10"/>
      <region id="center" width="160" height="120" left="0"
top="40"/>
    </layout>
  </head>
  <body>
    
    <text src="image.txt" region="up"/>
  </body>
</smil>
```

Figure 9 : Example of SMIL

8.5 MMS Security Model between MMS user agent and MMS relay

The transfer of MMs between the user agent and the MMS relay shall be made secure by using WTLS and the WIM.

8.5.1 Delivery of Multimedia Messages

As the originator of a MM is authenticated using WTLS and WIM, a MM sent to a recipient with the same MMS relay as the sender, means the recipient can be assured of the identity of the sender.

8.5.2 Retrieval of Multimedia Messages

The retrieval is divided into two phases: first notification and then retrieval. In order to prevent malicious notifications, the notification shall be authenticated. This is achieved by using the keys provided by the MMS relay at subscription. Similarly, at the retrieval phase, the MMS relay shall authenticate the terminal requesting access. Authentication shall be performed by using the WAP tools WTLS and WIM.

8.5.3 Delivery Report

The delivery report shall be identified by the message ID used to submit the message. As the message ID is unique within the terminal that originated the message there is no need for authentication.

Annex A (Informative): Simplified information flows

1. Terminal originated flows

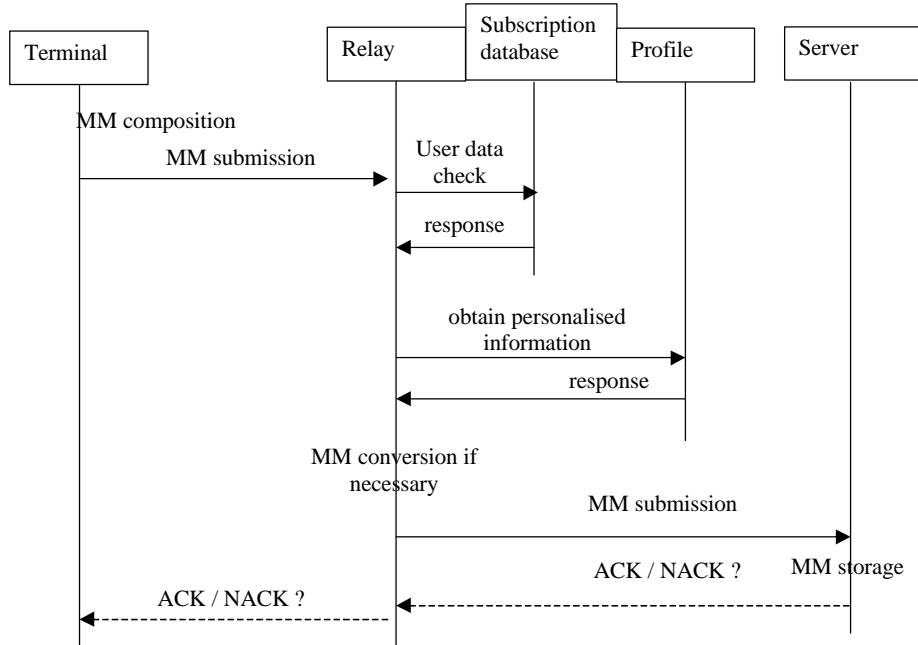


Figure 10: MM origination

The MM is composed on the terminal and sent as a submission to the Relay. Then the Relay may check the subscription data if required (subject to prior MM session establishment) and then obtains the personalised information from the profile. MM is processed and stored according to the profile information in preparation for delivery.

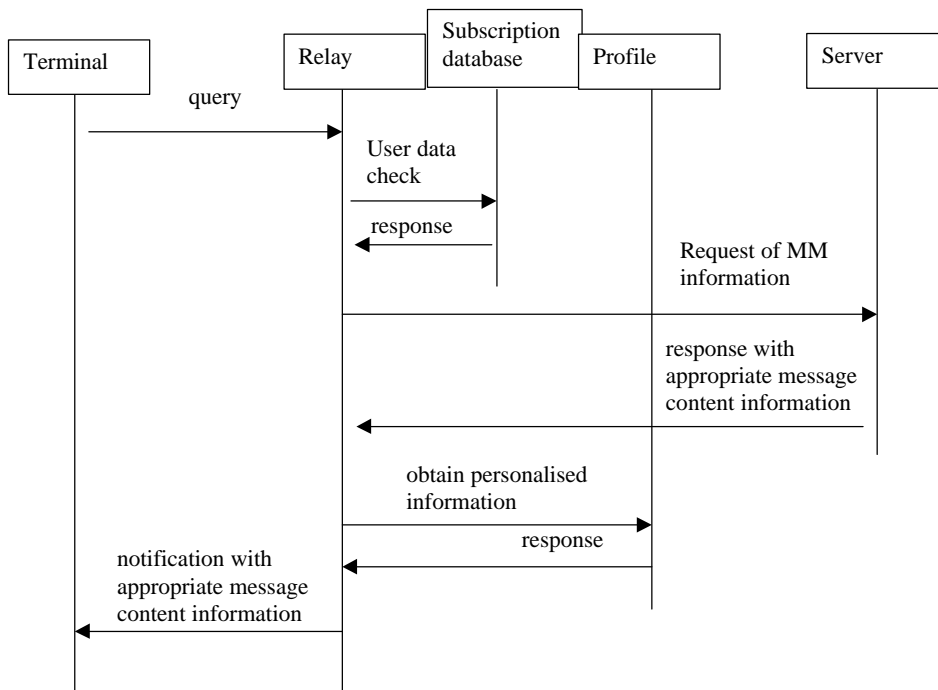


Figure 11: Query MM Information

The figure above shows the terminal originated MM query about messages. The terminal sends a query to the Relay about messages (and message contents) stored in the server. Then the Relay makes a user data check from the Subscription database if required (subject to prior MM session establishment). The purpose of this action is to ensure that the user has the right to perform this operation.

The Relay sends a request of MM information to the server. Server responses with message information. This response could contain e.g. the information about the number of messages stored in the server and information what kind of message elements stored messages contains. Then Relay obtains the personalised information of the recipient from the Profile. Finally the Relay sends to the terminal notification with message information.

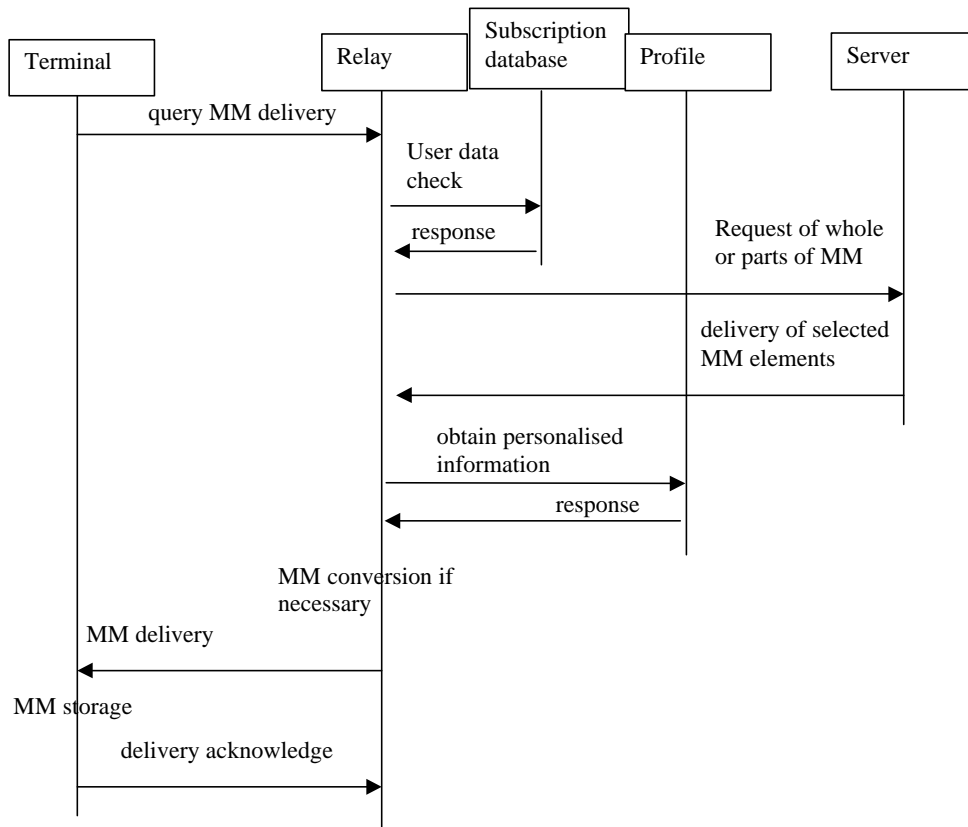


Figure 12: MM pull delivery

The terminal requests a delivery of a specific MM from the relay. The whole MM or parts of it could be requested. The relay checks the subscription data if required (subject to prior MM session establishment) and then sends a request to the server to deliver the wanted elements. When the relay receives the information from the server, it obtains the personalised information from the profile and converts the MM if necessary. Then the MM is sent to the terminal and the terminal acknowledge the delivery.

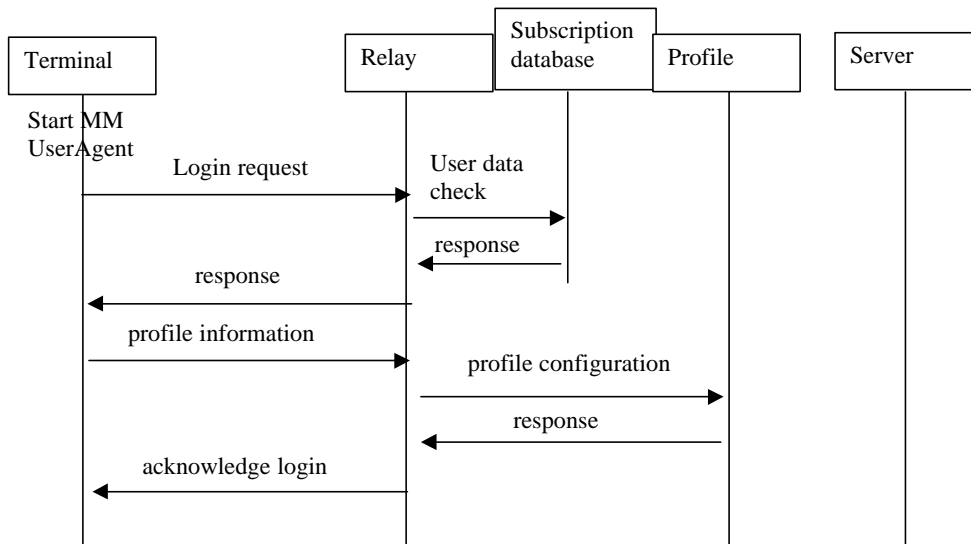


Figure 13: MM session establishment

The login request, including the user's credentials, is checked by the relay function either when the MM user agent starts or upon initiation by the user. The purpose of the request is to allow the user to be authenticated and gain access to MM server and establish a MM session. During this process the MM user agent also sends profile information relating to the capabilities of the terminal and preferences of the user.

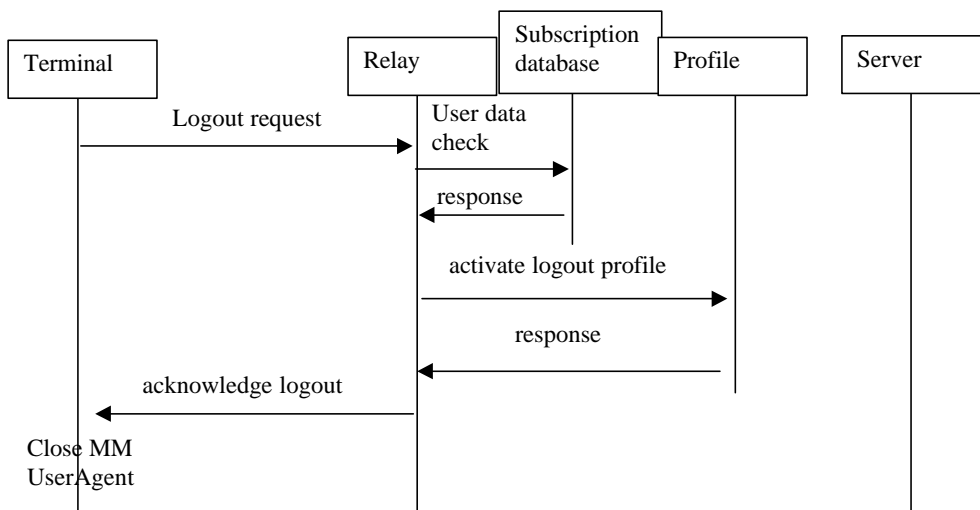


Figure 14: MM session termination

User Agent submits logout request to the Relay. The Relay may check the subscription data if required (subject to prior MM session establishment) and activate the logout profile if required. Then the Relay submits the acknowledge of logout request to the User Agent, finally User Agent closes itself.

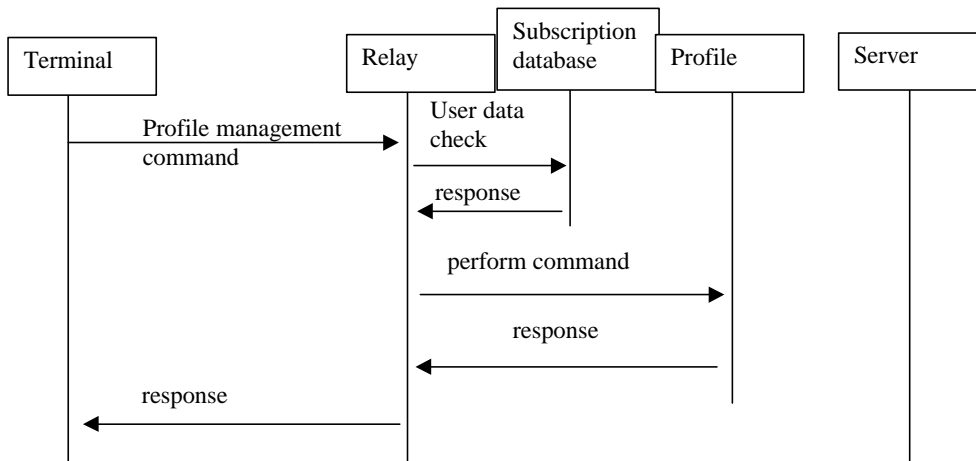


Figure 15: Profile management

A profile management command (e.g. modify the profile settings) is sent to the Relay by the terminal. The Relay may check the subscription data if required (subject to prior MM session establishment) and then gets access to the profile where the requested command is performed. The result of this operation is then sent back to the terminal via the Relay.

2. Terminal terminated flows

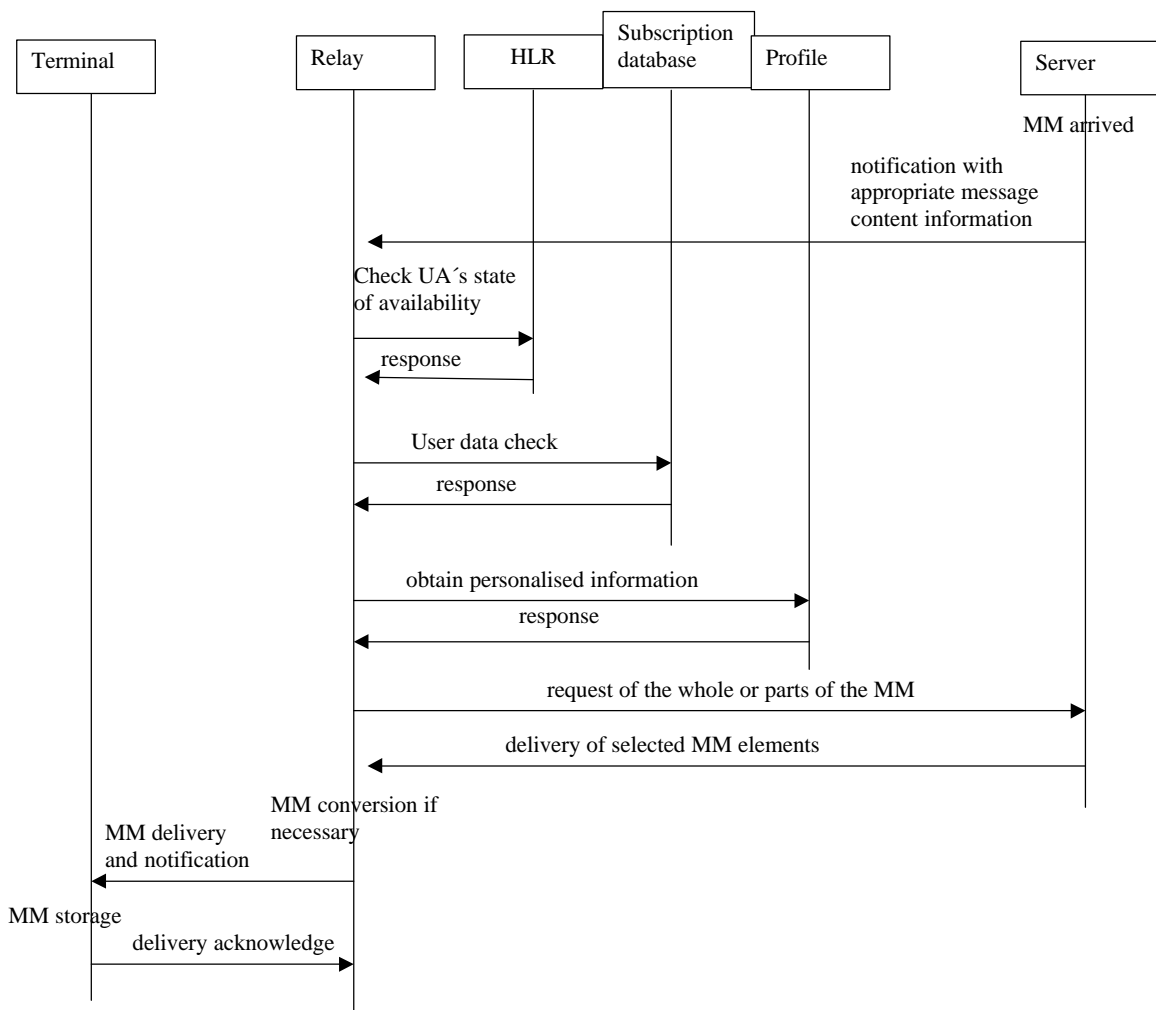


Figure 16 : MM push delivery

When a MM has arrived at the Server, the Server notifies the Relay. This notification contains further information of the MM (e.g. directory of MM elements together type and size). Then the Relay may check the subscription data if required (subject to prior MM session establishment) and then obtains the personalised information from the profile.

After requesting the MM or MM elements by the Relay, the server delivers the MM or elements to the Relay. If conversion is necessary, the relay will do the appropriate conversion before the MM or MM elements are delivered to the terminal. If MM elements are processed according to the profile information at the Server, e.g. MM or MM elements are deleted, forwarded to another server or stored for later retrieval, a notification is embedded within the MM delivery. The MM will be stored and the Terminal sends an acknowledgement to the relay.

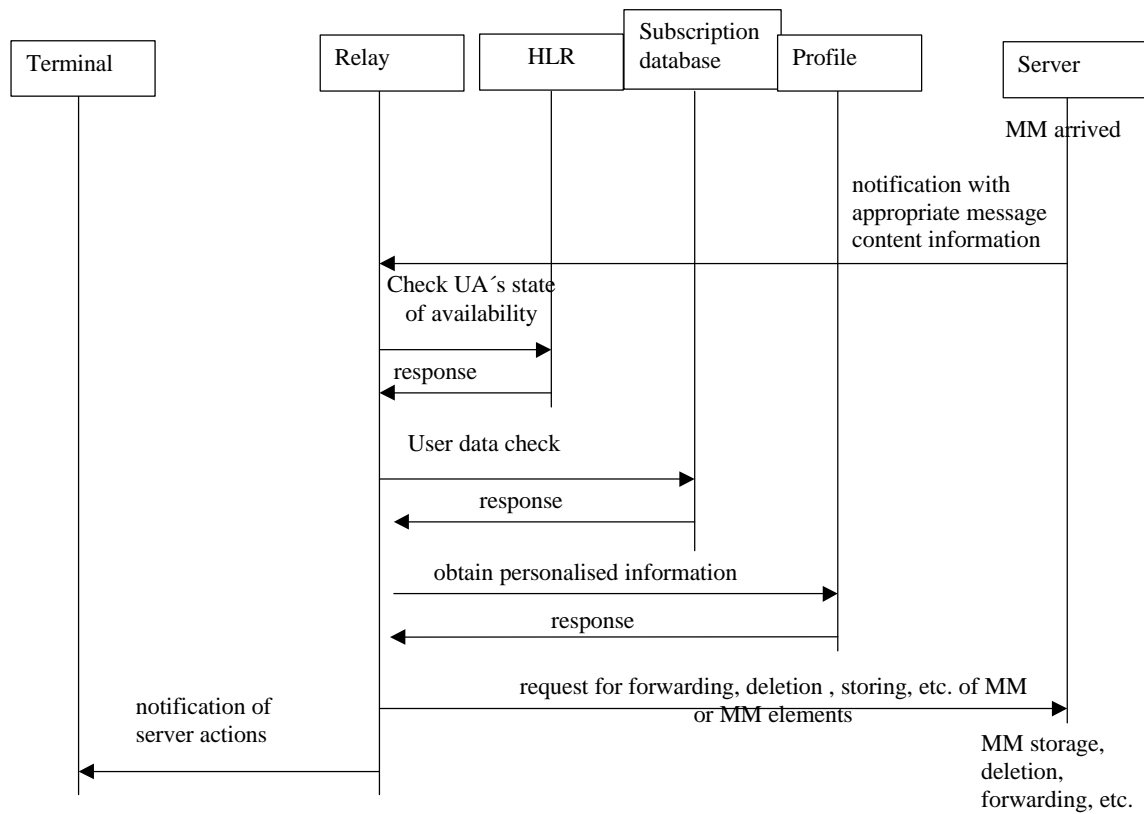


Figure 17: notification of automatic server actions

When a MM has arrived at the Server, the Server notifies the Relay. This notification contains further information of the MM (e.g. directory of MM elements together type and size). Then the Relay may check the subscription data if required (subject to prior MM session establishment) and then obtains the personalised information from the profile. MM is processed according to the profile information at the Server, e.g. MM or MM elements are deleted, forwarded to another server or stored for later retrieval using pull delivery. Subsequent to that server processing, the Relay may notify, depending on the settings in the profile, the Terminal of the actions undertaken at the Server.

3. Failure Handling

This section identifies different failure situations which may occur during the information exchange scenarios.

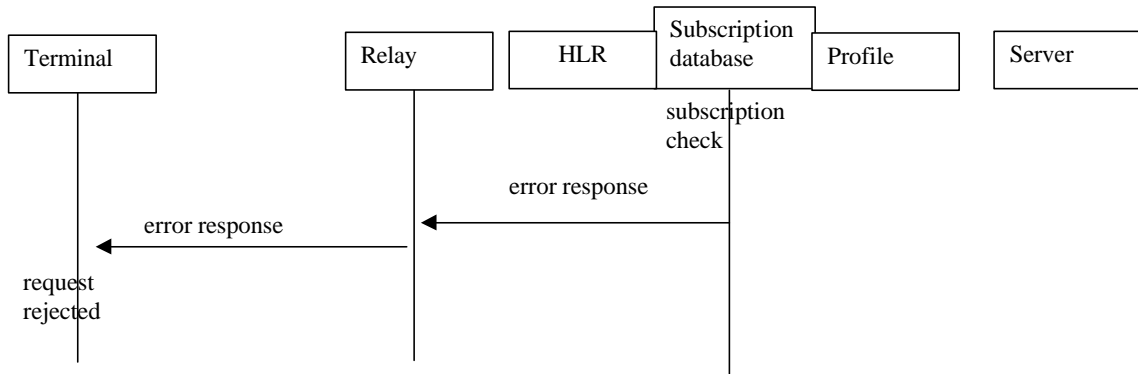


Figure 18: Failure handling (subscription check failure)

If the subscription check fails, e.g. due to an invalid subscription, the subscription database responds with an error to the Relay which forwards the error response to the terminal. Then the terminal rejects the originating request.

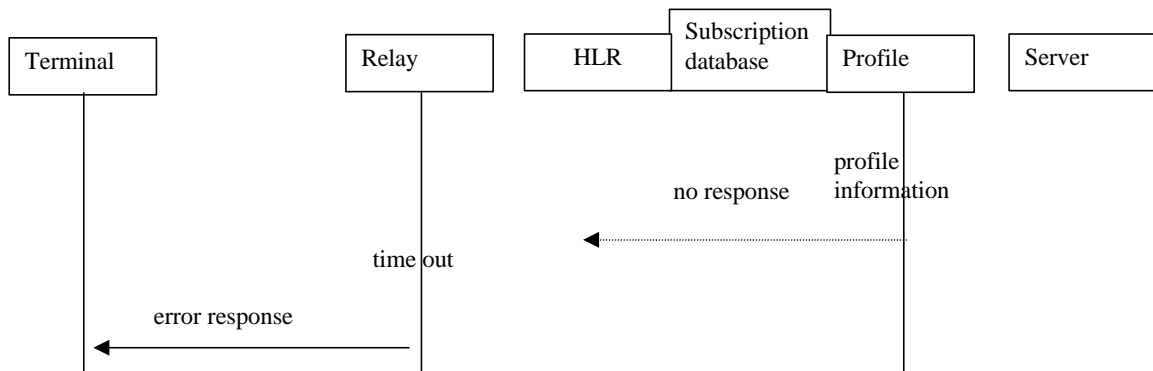


Figure 19: Failure handling (profile check failure)

Another failure occurs if the Relay does not receive the expected response form the Profile after obtaining profile information within a specified time frame. Then the Relay sends an error to the Terminal indicating an unsuccessful operation.

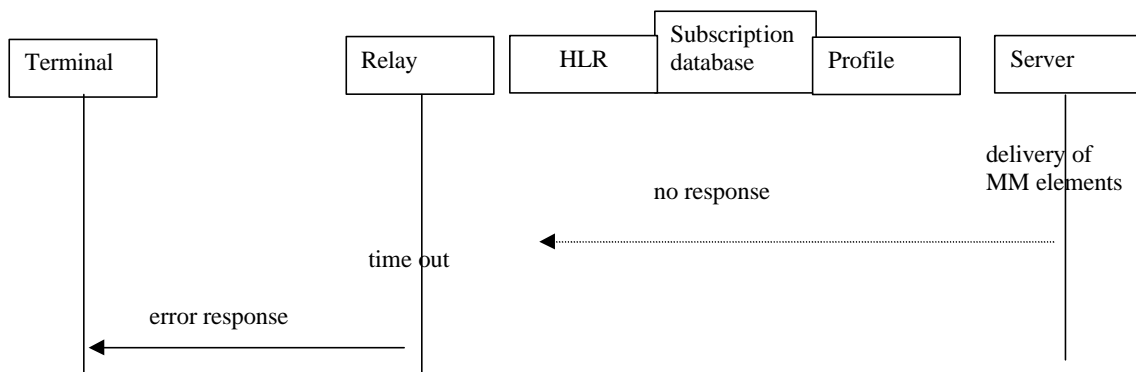


Figure 20: Failure handling (download failure)

Another failure occurs if the Relay does not receive the expected response from the Server after a request of delivering MM or MM elements within a specified time frame. Then the Relay sends an error to the Terminal indicating an unsuccessful operation.

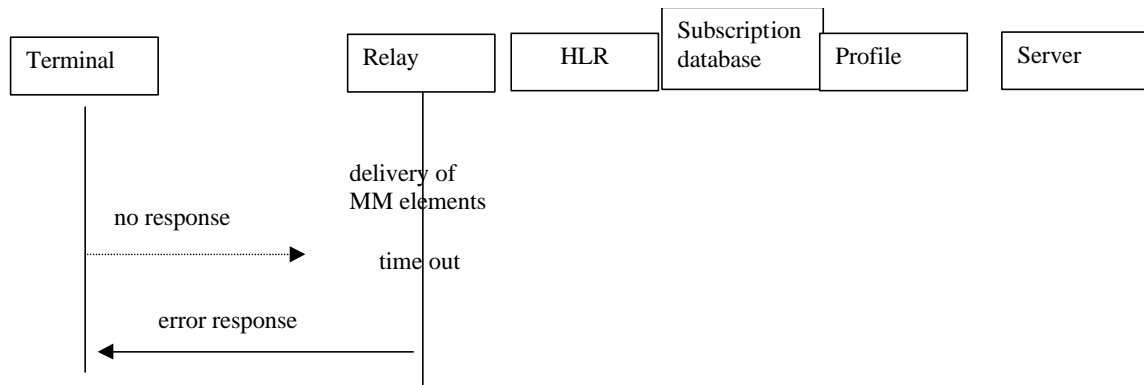


Figure 21: Failure handling (upload failure)

Another failure occurs if the Relay does not receive an expected acknowledgement from the terminal delivering MM or MM elements, within a specified time frame. Then the Relay sends an error to the Terminal indicating an unsuccessful operation.

Editors note:- confirmation of delivery and confirmation of MM being presented and Relay action after successful MM delivery must be added

History

Document history		
V. 0.0.0	October 1999	Initial Skeleton
V. 0.1.0	October 1999	Version after TSG-T-WG2#5
V.0.1.1	November 1999	Version after TSG-T-WG2 MMS Stage 2 ad hoc
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