Voice Messaging Service Definition

1.4

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Feedback

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BACKGROUND

SMS has proven to be a successful means of communication to support simple, secure, store and forward text-based messaging between our customers.

Recently, some operators have launched a messaging service for voice-based communication ("Voice Messaging"), where customers are given the opportunity to exchange short voice-based messages.

The perceived customer value of such a service is along the following lines:

- People with limited reading and writing communication skills can enjoy SMS-type communication
- Cool, audio enriched messages including e.g. music, greetings, contribution from several participants, etc. act as a complement to standard SMS and MMS type messaging for most customers
- For the A-Party the Voice Messaging service is an unobtrusive complement to traditional Voice Mail in the sense that the A-party can choose directly the Voice Messaging service rather than first attempting to establish direct voice contact with the B-party.
- Voice Messaging provides a simple user interface in situations where the ability to type text messages is restricted, for instance when driving.

While Voice Messaging has similar advantages to SMS as a communication service, it is important to note that this is where the similarity ends. Voice Messaging requires a dedicated point-to-point voice traffic channel to be set up, unlike SMS, which is carried over the signalling plane.

It could be argued that Voice Messaging is already covered by Voice Mail services, but it can be seen that Voice Mail services are not well subscribed to in the markets where Voice Messaging has already been deployed. The Voice Messaging service also provides a much simpler user interface and typical charging is on a per message basis and not on the actual length of the call (the length being subject to a cap).

However, current Voice Messaging implementations are not standardised and therefore the service in general has limitations specifically related to interworking between operators and the support of roaming users.

It is, therefore, necessary to develop an interworking service definition for Voice Messaging so that users can send messages to, and receive such messages from, users who are subscribers to other operators.

It is also necessary to specify a service access method to support access to the service for users that are roaming in other networks to both send and retrieve Voice Messages.

The work includes recommendations to charging principles to be used for Voice Messages crossing network boundaries, as well as for sending and retrieving such messages when roaming.

A future phase of the project may look at device user interfaces for being able to send the Voice Message directly from the contact list or address book, if the market deems that work is required in this space.

1 OVERVIEW OF THE SERVICE

1.1 Introduction

The Voice Messaging service is a supplement to existing messaging services allowing users to exchange audio based messages, stored and forwarded on a server in the network. It differs from SMS in that it supports audio instead of text and that it requires use of a dedicated voice connection to “send” and “receive” messages. The service also differs from MMS in that it only supports audio content, as opposed to MMS, which supports text, images and video. Most importantly, unlike SMS and MMS, Voice Messaging does not have any dependencies on terminal capabilities and thus any voice-enabled terminal can be used to deposit and retrieve the messages (including also fixed-line and IP-based terminals).

Several operators have already launched a Voice Messaging service, and this has so far been a success for exchange of Voice Messages among an operator’s own subscribers. However, lack of standardisation has limited users to send messages to customers of other operators. Experience also shows that current methods applied to retrieval of messages are not sufficient for the support of roaming users.

To realise the full revenue-generating potential of this service, it is necessary to develop an inter-operability service definition for Voice Messaging such that users can send messages to, and receive such messages from, their contacts who are subscribers to other operators. It is also necessary to develop a service definition to support access to the service for roaming users.

This Voice Messaging service is likely to be targeted at all market segments and include various retail charging models, such as pay-per-use, pre-pay, and subscription-based. Operators may offer this service to drive messaging revenue or to add to bottom line revenue figures as a service in its own right. However this is not the scope of this service definition document.

1.2 Project Information

Project team

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1.3 Scope & assumptions made

The main scope of this Service Definition document is to establish the framework for the Voice Messaging service within which operators can enable interworking of the service across network borders and support the use of the service for roaming users.

1.4 High-level Service Concept (10)

The main functionality of the Voice Messaging service is to enable mobile subscribers to communicate with each other by exchanging short Voice Messages. A customer initiates the deposit of a Voice Message by dialling a pre-assigned code with the mobile number of the recipient. Messages are recorded on an audio file via audio equipment in the network. The audio file is stored centrally in the network and later played back from the audio equipment to the receiver of the message on request.

A voice channel has to be established between the user's terminal and the network audio server before messages can be recorded or played back.

The service does not differentiate between any customer segments; the service can be offered to and used by any segment.

2 SERVICE DESCRIPTION

2.1 Service Specifications / Use Cases (20)

The following table, Table 1, gives a definition of the actors involved in the service specification and the following use cases.

Table 1 Definition of actors

Actor	Definition
User A	A subscriber who sends (submits) a Voice Message
User B	A (recipient) subscriber to whom a message sent by User A is addressed and who may retrieve the message from A upon receiving a corresponding notification (usually via SMS).
Operator A, HPMN A	The Home Operator of User A
Operator B, HPMN B	The Home Operator of User B
VPMN A	The serving network of User A in case User A is roaming
VPMN B	The serving network of User B in case User B is roaming

There are 5 main functions for Voice Messaging service, as depicted in Table 2. The "Function" column indicates those user-generated actions that trigger a message being transferred between operators (when users are subscribers of different operators and both

operators offer the service) and where the voice message is stored. The last column indicates whether interworking has to be considered for the different functions.

Table 2: Voice Messaging functions

Function	Description
1. Send	Sending of a voice message - sending subscriber will connect to a voice server, which will record and store the message.
2. Retrieve (and subsequently Delete)	Retrieval of a voice message - recipient subscriber will connect to a voice server, which will play the stored message. Subsequent to playing the message, the subscriber could be given the option to delete the message.
3. Forward	Forwarding of a received voice message – having listened to a message the subscriber could be given the option to forward the message to another subscriber.
4. Reply	Replying to a received voice message - having listened to a message the subscriber could be given the option to record a voice message as a reply.

Messages are always recorded and stored locally on the Voice Messaging server of Operator A (home operator of subscriber who sends a Voice Message) and then subsequently transferred/copied to the Voice Messaging server of Operator B (home operator of recipient subscriber). It is currently proposed that messages be transferred to the destination operator as soon as the identity of the destination operator has been ascertained, i.e. in case of Send of voice message from Operator A to B, the message will be sent to Operator B after it has been deposited at Operator A's Voice Messaging server. The recipient subscriber of Operator B can retrieve the message subsequent to that at any point in time.

Depending on functionality offered by the Voice Messaging server, deletion of voice messages from the server can either be done automatically (e.g. a maximum of 10 messages allowed in store) or by a deliberate action made by the user (e.g. subsequently to having retrieved/listened to a message the user can be given the option to delete it). This is however up to local operator implementation.

To enable such exchange of messages, an important capability of interworking would be the determination of the destination Operator from the called party number.

The called and calling party number format available to Voice Messaging service should be in an appropriate format sufficient for determining the address of the recipient operators Voice Messaging server. For international exchange of messages, the E.164 international number format should be used.

The following sub-sections give some informative examples and alternatives on how the service works for the basic functions of:

1. Sending of voice message
2. Retrieval of voice message

2.1.1 Sending of voice message

The end-user action for sending Voice Messages does not affect service interworking, and is primarily based on network-dependent, prefix-based access mechanisms.

The Voice Messaging service differs from Voice Mail service in the way that the sending user always connects to the Voice Messaging server of his HPMN to deposit the voice message.

At present, some alternatives identified for accessing Voice Messaging service are:

Alt. 1:

1. The user adds a prefix to the B-number, e.g. "*", and initiates an outgoing call, this results in a voice channel being set up between the user's terminal and the audio equipment in the operator's network.
2. The user hears a notification sound when recording starts
3. The user then has a limited time (Tmax) to record a message (e.g. 30 seconds)

Alt. 2:

1. The user adds a service code e.g. "0123" before the B-number, and initiates an outgoing call. The rest of the sequence is the same as for Alt. 1.

Alt. 3:

1. The user dials a specific service access number, resulting in a voice channel being set up between user's terminal and the audio equipment in the operator's network.
2. The user is presented an interactive voice menu where he selects to record a new message by using DTMF or speech recognition, and is then prompted to enter B-number
3. The user enters B-number finishing with a postfix e.g. "#". The rest of the sequence is as described in bullet 2-3 for Alt. 1.

Other means of access may also be possible.

The user disconnects when he has finished recording the message (a signal is given and recording stops if the time limit (Tmax) is breached), or the system may simply disconnect the call upon reaching the limit (Tmax).

When a new voice message is stored, the voice message application initiates the sending of a flash SMS (or possibly regular SMS if the user has other undelivered voice messages in his inbox) to the recipient of the message.

As an alternative to sending a notification SMS to the recipient, some Voice Messaging servers may be capable of placing a voice call directly to the recipient and play the voice messages automatically. This is entirely network-dependent and does not affect the service interworking in any way.

2.1.2 Retrieval of voice message

The end-user action for retrieval of voice messages does not affect service interworking, and is primarily based on network-dependent, prefix-based access mechanisms.

The retrieval of Voice Messages is very similar to that of Voice Mail, in the sense that the recipient would connect to the Voice Messaging server of his HPMN to retrieve the message. The difference would be in the simpler access mechanisms that Voice Messaging provides for users to retrieve and play Voice Messages.

The procedure for receiving a Voice Message can be as follows:

The user receives an SMS notification with retrieval information when he receives a new Voice Message. The user then applies a defined access method to retrieve the Voice Messages:

Alt. 1:

1. The user press *X*, where X is a number between 0-9, resulting in a voice channel being set up between the user's terminal and the audio equipment in the operator's network. Message requested is automatically played based on the selected number as follows:

    a. If user entered *0*, the most recently received voice message is played, or
    b. If the user entered *X*, where X is a number between 1-9, earlier received voice messages will be played.

Alt. 2:

1. The user dials an access code e.g. "0123" followed by a number between 0-9, resulting in a voice channel being set up between user's terminal and the audio equipment in the operator's network. Message requested is automatically played based on the selected number, following the rules presented in Alt. 1.

Alt. 3:

1. The user dials a specific service access number, resulting in a voice channel being set up between user's terminal and the audio equipment in the operator's network.
2. The user is presented an interactive voice menu where he selects to retrieve the newest message, by the use of DTMF or speech recognition.
3. New messages are then played sequentially; the user can optionally be prompted before playing of each new message.
4. Users can also via the interactive voice menu select to play other stored messages that have been played earlier.

Other means of access may also be possible.

The Voice Messaging server may support the function of replying to a specific voice message. This could be offered as an option to the user in the same call session being used for retrieval of a voice message.

Note that the above is entirely network-dependent and does not affect the service interworking in any way.

2.1.3 Combined approach

It is possible to combine the suggested alternatives for sending and receiving Voice Messages in the same Voice Messaging server. This will ensure that a simple user interface is provided to domestic users and at the same time facilitate access to the service for roaming users.

2.1.4 Interaction with other services

Voice Mail
The Voice Messaging service shares functionality with Voice Mail and a reasonable option will, therefore, be to implement the Voice Messaging service as part of the Voice Mail system. Almost all mobile phones will support Voice Messaging, and there is no need to make any changes to the terminal. This is highly network-dependent, and current implementations do not see a common architecture for both Voice Messaging and Voice Mail.

SMS
Voice Messaging will interact with an SMS enabling function to send a flash or regular SMS indication to the receiving user.

MMS
There is no interaction currently specified. An option to retrieval of a voice message could be to deliver the voice message to the subscriber in an MMS message, but this would be contrarian to the basic idea behind the Voice Messaging service: simplicity. The success seen with Voice Messaging in some markets is partly due to the service being available all the time from all handsets, and while it is a safe assumption in mature markets that the majority of the handsets are MMS enabled, this might not be the situation in more immature markets.

IM
There is no interaction currently specified. The same arguments apply as for MMS, and it is not advisable to let the Voice Messaging service use IM for transporting messages. The expectations regarding IM centre around IM being a future-oriented messaging type, and as such it makes sense to study inclusion of Voice Messages within IM messages, pending on presence status. Again, the simplicity aspect of Voice Messaging should be carefully considered. The other option, to use Voice Messaging as an enabler available from IM, makes sense, and this could be considered as part of an IM project.

2.1.5 Implementation options

The following implementation options seem to be the most popular for Voice Messaging:

1. Stand-alone system
2. Combined with a Voice Mail system
3. As an application running through a generic voice portal framework using VXML, possibly enhanced with CCXML for additional call control options.

The choice of option is obviously an operator decision, but the above options seem to be in increasing order of suitability based on the maturity of the operator and the market.

2.2 Service Requirements and Enablers (70)

A key enabler element for the Voice Messaging service is a Voice Messaging Server (VMS) that can provide the following functions at a minimum:

- Storing of Voice Messages in a manner where all customers have their own addressable message store according to capacity rules to be agreed upon at service provisioning
- Interfaces for
    a) storing messages from the sending user,
    b) transferring messages to remote server (SMTP over a point-to-point connection)
    c) receiving messages from remote server (SMTP over a point-to-point connection),
    d) retrieval of messages from the receiving user

2.3 Service Interworking and roaming scenarios (21)

When an operator supports Voice Messaging, the subscribers of that operator can exchange Voice Messages with each other. In addition, if the operator supports interworking capabilities, it will allow subscribers to exchange Messages with each other, regardless of which operator they subscribe to.

As Voice Messages are deposited and retrieved from the VMS of the HPMN, it is also important to consider support of roaming subscribers.

This section is divided in two parts, describing interworking scenarios and scenarios for roaming. When evaluating the scenarios with regards to need for interworking and support of roaming subscribers, the following assumptions have been taken into account:

- To send a Voice Message, users shall connect to the VMS of their home operator
- When sending and receiving users are subscribers of different operators (Operator A and Operator B), and if a subscriber of Operator A sends a message to a subscriber of Operator B:

  - If both operators offer the Voice Messaging service, the Voice Message shall be transferred from the VMS of Operator A to the VMS of Operator B.
  - If only Operator A offers the Voice Messaging service, it should be possible for subscribers of Operator B to retrieve messages from Operator A's VMS.
- To retrieve messages, users shall primarily connect to the VMS of their home operator. If this operator does not support the Voice Messaging service, it should be possible for the subscriber to retrieve Voice Messages by connecting to the sending operator's VMS.
- The customer experience of existing Voice Messaging services should not change with the introduction of interworking.

As Table 2 shows, the functions relevant for interworking considerations are the "Send", "Forward" and the "Reply" functions, and for roaming all functions are relevant to be considered. "Forward" and "Reply" can be considered special cases of the "Send" function and thus need not be treated in any more detail than is relevant for the "Send" function.

2.3.1 Interworking scenarios

Table 3 shows Voice messaging functions related to the corresponding interworking requirements for transfer of messages between operators.

Table 3 Voice Messaging functions interworking requirements

Function	Routing	Interworking required?
1. Send	Operator A => Operator B	Yes, for exchange of messages between operators VMS systems when users are subscribers of different operators
2. Retrieve (and subsequently Delete)	Not applicable	No
3. Forward	Operator A => Operator B	Yes (same as for Send)
4. Reply	Operator A => Operator B	Yes (same as for Send)

2.3.1.1 Sending of voice message

Use case 1.A:
When both sender and receiver are subscribers of the same operator, no interworking is required.

Use case 1.B:
When sender and receiver are subscribers of different operators, and both operators offer Voice Messaging service, interworking is required for the transfer of messages from sending operator's VMS to receiving operator's VMS.

Use case 1.C:
When sender and receiver are subscribers of different operators, and only the sender's operator offers Voice Messaging service, no interworking is required for the sending of a

Voice Message. Specific operator agreements could be required for the recipient to retrieve the Voice Message from the VMS belonging to sending users HPMN.

For interworking, where sending and receiving subscribers are customers of different operators and where both operators offer the Voice Messaging service, the simplest solution is a direct transfer of messages between the operators' VMSs as depicted in Figure 1.

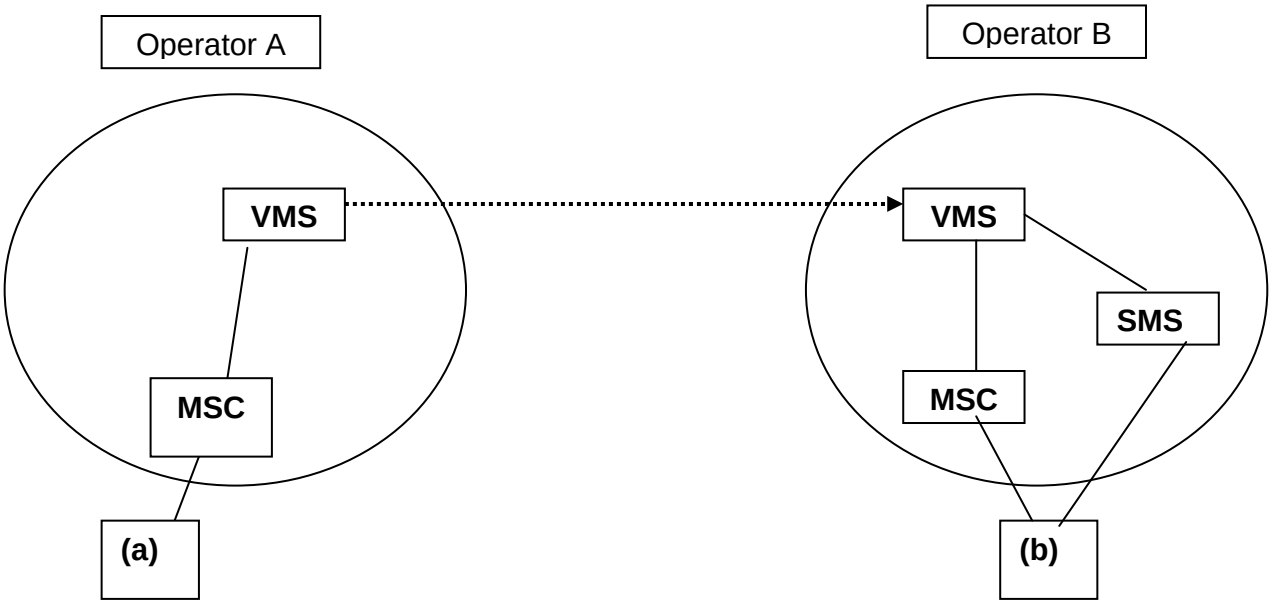

Figure 1 Distributed interworking method

Figure 1 illustrates a distributed interworking capability where voice messages are transferred directly between Operator A and Operator B. It is essential for this method that the VMS of Operator A is able to resolve the destination operator VMS address given the called party number in E.164 format. The resolved destination nodal addresses shall either be in internet e-mail format as defined in RFC 2822 or it shall comply to the MM4 address format defined in 3GPP 23.140, conforming nodal addresses having been exchanged by both operators at the time of signing the Voice Messaging Inter-working Agreement (AA.60).

Upon determination of the destination address, it can send a message packet directly to receiving VMS using SMTP over a point-to-point connection (similar to the MM4 interface that is present in the case of MMS interworking). This would be the preferred method for a small set of operators or domestic inter-working within a country.

Note that the point-to-point connection may be a leased line or any other form of connectivity using IP. This is not prescriptive and operators may choose the connection depending on their bilateral requirements.

The described scenario requires that both operators implement and offer a Voice Messaging service, but this might not be the case. It should be possible also to send voice

messages to customers of operators who do not offer this service. This requires the notification SMS to carry valid access information in the receivers network.

Note however that such an implementation has several issues related to Spam messaging. If the HPMN of the recipient is not aware of the Voice Messaging service being offered by another operator, then the operator is fully justified in treating these messages as Spam SMS from the originating operator.

To avoid any complications, it is therefore recommended that an operator offering the Voice Messaging service beyond its own network should have an inter-working agreement with all other operators that it believes its customers will send messages to, regardless of whether these operators have a Voice Messaging service. Any bilateral arrangements can of course supersede this recommendation.

Another method that could be used for transfer of voice messages between operators is the use of a HUB concept as described in referenced document [1]. Here a central HUB takes the responsibility of resolving addresses and relay messages to the receiving operators VMS. This functionality could be added in later phases if it is deemed appropriate.

2.3.1.2 Message transfer solution

When a message has been recorded, the recipient number is examined by the Voice Messaging server.

If the recipient belongs to a different operator, the message is forwarded to the recipient operator's VMS using the methods specified below.

The protocol used to send recorded voice messages between VMS's shall be SMTP over a point-to-point connection. This is very similar to the technical manifestation of MMS interworking on the MM4 interface between 2 operator MMSCs. The inter-carrier resolution of domain names and resolution of destination subscriber VMS address can therefore be considered as being able to adhere to the guidelines defined in GSMNA-CDG MMS Joint Project; MMS Inter-carrier Implementation Guideline [1] (of course, replacing all instances of the MMSC with VMS, and MMS with Voice Messages).

The transfer of messages between VMSs can again be considered in a similar manner to the transfer of MMS between peer MMSCs. Therefore the point-to-point SMTP connectivity between peer VMSs can adhere to the MM4 interface requirements defined in 3GPP technical specification TS 23.140 V.6.14.0 [2] ((of course, replacing all instances of the MMSC with VMS, and MMS with Voice Messages).

As noted in the referenced document [1], the MMS compliance recommendations contained in the OMA MMS Conformance Document [3] or in subsequent revisions of this document should be followed as a guideline for implementing Voice Messaging interworking along the same lines as MMS Interworking. As recommended in referenced document [3] for MMS, we can adopt a similar mechanism for the transfer of speech audio via Voice Messages, and this would mean that the data encoding used for Voice Messages would be AMR-NB when transferring recorded speech files between VMSs.

As noted in referenced document [3], the use of SRI_SM to query the home network subscriber's HLR and obtain the destination subscribers' IMSI is permitted in order to resolve the network identity of the destination subscribers' home VMS. This mechanism shall be adopted as the initial destination network discovery mechanism, relying on the association of an IMSI returned from the HLR of the destination MSISDN owner with a domain name compliant with the requirements specified by referenced document [3]. This domain name shall be used to construct a fully qualified destination VMS address for use when routing the Voice Message.

For the exchange of messages between operators VMSs at an interworking level, the maximum length of a voice message shall be limited to 60 seconds. This would be further clarified during the bilateral agreement for Voice Messaging Interworking between operators.

2.3.1.3 SMS notification

When a voice message has been recorded, delivered and stored in the correct Voice Messaging Server according to section 2.3.1, the VMS of the recipient is responsible of initiating a notification to the recipient containing instructions on how to retrieve the voice message. This notification could be a flash SMS or a normal SMS (implementation is operator-dependent). The notification SMS usually would contain a direct link to the waiting Voice Message, so that the recipient user just needs to press the "call" button in order to connect to the VMS and retrieve the Voice Message.

2.3.2 Roaming scenarios

Table 4 shows Voice messaging functions related to the corresponding roaming requirements for call placed to VMS of HPMN when users are roaming.

Table 4 Voice Messaging functions roaming requirements

Function	Routing	Roaming agreements required?
1. Send	VPMN A => Operator A	Yes, for sending users call placed to VMS of HPMN A when user is roaming
2. Retrieve (and subsequently Delete)	VPMN B => Operator B	Yes, for retrieving users call placed to VMS of HPMN B when user is roaming
3. Forward	VPMN A => Operator A	Yes (same as for Send)
4. Reply	VPMN A => Operator A	Yes (same as for Send)

2.3.2.1 Sending of voice message

Use case 2.A:

When sending user is roaming outside the HPMN, a specific roaming agreement for Voice Messaging is required for the call placed to "home" VMS, to achieve a specific charging of

the call as described in section 2.4.2. Otherwise such a call will be treated as an ordinary voice call in the VPMN and will be charged as such in accordance with the existing voice roaming agreement between the HPMN and the VPMN.

2.3.2.2 Retrieval of voice message

Use case 2.B:

When the recipient is roaming outside the HPMN, a specific roaming agreement for Voice Messaging is required for receiving users call placed to “home” VMS to retrieve the message as described in section 2.4.2. Otherwise, such a call will be treated as an ordinary voice call in the VPMN and will be charged as such in accordance with the existing voice roaming agreement between the HPMN and the VPMN.

2.3.2.3 Roaming call solutions

A challenge when considering roaming scenarios is that the service access method deployed in the home network may be used differently in the visited network.

One possible solution for this is to agree on a universal common access method, which will be supported as part of a roaming agreement between any two parties. However, this is highly unlikely as the short code penetration within the GSM community is highly localised and fragmented. This service definition does not intend to provide a universal access code for Voice Messaging (sending and retrieval) across all GSM networks.

A more practical alternative is to let the user connect to the VMS in his HPMN for the sending and retrieval of Voice Messages. This scenario is similar to users today having to employ a ‘long code’ (i.e. a full E.164 number) to retrieve their voice mails when they are roaming. It is therefore the responsibility of the HPMN to educate its customers on the access mechanisms for Voice Messaging when roaming. The instructions may form part of the notification messages for retrieval as well, but this is entirely up to individual operator implementation.

A second challenge for accessing the Voice Messaging service while roaming is the rating of the service at the VPMN. Voice Messaging is a unique service in its own right, and in all likelihood positioned as an alternative to SMS with similar charging models, and as such, the normal roaming voice charges would be inconsistent with the local perception of the service. One solution for this is to agree on a charging type for Voice Messaging, and treat Voice Messaging as a separate service schedule within the relevant roaming agreements (AA.14). Bilateral arrangements between operators could be made on special charging on roaming calls for the sending and retrieval of voice messages, based on the use of specific number levels or E.164 addressable Global Titles of VMS systems.

More enhanced functions for support of roaming scenarios could be added to later versions of the document.

2.4 Service level interworking transactions & charging Principles (22)

The following service level interworking transactions & charging principles are identified:

2.4.1 Interworking

Table 5 Wholesale and retail charging principles for interworking use cases

Use case	Use case description	Wholesale charging principle at interworking (IW) point	Retail charging principle
1A	User A and User B are subscribers of same operator	Not applicable	Operator decision
1B	User A and User B are subscribers of different operators	Charging on a per message basis	Operator decision
1C	User A and User B are subscribers of different operators, only User A's operator supports Voice Message	Not applicable	Operator decision, operators may agree upon separate charge for call placed by User B to Operator A's VMS based on dialling codes (E.164 or otherwise) previously agreed.

2.4.2 Roaming

Table 6 Wholesale and retail charging principles for roaming use cases

Use case	Use case description	Wholesale charging principle at interworking (IW) point	Wholesale roaming charging principle
2A	User A sending Voice Message while roaming	Charging on a per-message basis if recipient is subscriber of different operator	Operators may agree upon separate charge for Voice Messaging from normal roaming voice calls based on bilateral agreement and identification of Voice Messaging calls (unique E.164 number or prefix)
2B	User B retrieving Voice Message while roaming	Not applicable, as retrieval is done from HPMN network VMS	Operators may agree upon separate charge for Voice Messaging from normal roaming voice calls based on bilateral agreement and

			identification of Voice Messaging calls (unique E.164 number or prefix)

2.5 Service and Application Inter-dependencies (40)

No service or application inter-dependencies identified

2.6 Gap Analysis to existing Standards (71)

No existing standards on Voice Messaging service.

2.7 Device Requirements (340)

The Voice Messaging service does not impose any specific requirements on the user's device other than general compliance to GSM specifications.

2.8 International Lawful Interception & privacy (60)

Same requirements will apply for Voice Messaging as for similar services like SMS/MMS and Voice-mail.

2.9 Security Review of Service Requirements (80)

Same requirements will apply for Voice Messaging as for similar services like SMS/MMS and Voice-mail.

2.10 Fraud Considerations & requirements (110)

Same requirements will apply for Voice Messaging as for similar services like SMS/MMS and Voice-mail.

3 REFERENCES

[1] GSMNA-CDG MMS Joint Project; MMS Inter-carrier Implementation Guideline, August 17th 2006
[2] 3GPP TS 23.140 V.6.14.0: TSG Core Network and Terminals: Multi-Media Messaging Service (MMS) Stage 2 (Release 6)
[3] OMA MMS Conformance Document 1.3 (Draft D, 15th February 2005 or later version)