Technical Specification Group Services and System Aspects
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Abstract of document:

The Technical Report identifies the issues and needs surrounding messaging solutions related to the 3GPP IP Multimedia Subsystem (IMS). The report identifies essential messaging requirements, taking into consideration use cases that illustrate the needs of both service providers and users. The report also highlights and contrasts the messaging capabilities of the 3GPP Multimedia Messaging Service and how these messaging capabilities might relate to or interact with the messaging services running in IMS.

Changes since last presentation to TSG-SA Meeting #XX:

N/A

Outstanding Issues:

The present document has some open items as listed below:

- the role of the IMS group management for some operations need to be clarified,
- address translation/mapping and
- availability of history information in context of session based messaging.

Remaining issues are expected to be completed by SA1#18.

Contentious Issues:

None

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Contents

Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (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 the present document, 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;
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- 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 document.

Introduction

This Technical Report identifies the issues and needs surrounding messaging solutions related to the 3GPP IP Multimedia Subsystem (IMS).

The report is designed to identify essential messaging requirements, taking into consideration use cases that illustrate the needs of both service providers and users.

The report also highlights and contrasts the messaging capabilities of the 3GPP Multimedia Messaging Service and how these messaging capabilities might relate to or interact with the messaging services running in IMS.

An evaluation of various messaging solutions and technologies is provided together with an analysis on how they relate to the identified requirements. Finally, conclusions are drawn on the possible actions 3GPP may wish to take in regards to potential future work.

1 Scope

The objective of this Technical Report is to:

a) Describe use cases that illustrate the service requirements for IMS messaging.

b) Derive the broad 3GPP requirements for IMS messaging services.

c) Investigate the possible requirements for interworking with networks outside the 3GPP domain

d) Develop an analysis of the possible interaction between IMS messaging services and existing 3GPP messaging services (SMS, EMS and MMS) as well as other relevant 3GPP services such as presence IMS group management and so on.

e) Identify possible routes to standardization by:

   1) Adopting existing and emerging standards, e.g. OMA, IETF.

   2) Modifying and enhancing existing and emerging standards.

   3) Developing of new standards.

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 TR 21.905: 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Vocabulary for 3GPP Specifications

[2] 3GPP TS 22.140: 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Stage 1, Multimedia messaging service

[3] 3GPP TS 22.250: 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Stage 1, IMS Group Management

[4] RFC 2486: "The Network Access Identifier"

[5] 3GPP TS 22.250: 3rd Generation Partnership Project; Technical Specification Group Services and Systems Aspects; IMS Group Management, Stage 1

[6] 3GPP TS 22.141: 3rd Generation Partnership Project; Technical Specification Group Services and Systems Aspects; Presence Service, Stage 1

3 Definitions, symbols and abbreviations

3.1 Definitions

3.2 Abbreviations

4 Messaging services

4.1 Background

In today's world there are many different types of messaging services available both in the wired and wireless worlds. Some services are supported in both, others are only found in one. For example, SMS has been designed for a wireless environment, whereas Instant Messaging has been designed for a wired environment. The expectations of these services also differ in that some services are designed to be used in what is perceived as 'real time' and others are designed as a 'mailbox' service where the message is stored ready for collection or delivery at a later date.

This section investigates current messaging services and examines the expectations and differences between them.

In summary this section highlights the important fact that services where the message is delivery in what is perceived as real time by the user, are currently only being offered within the wired world, whereas all standardized services within the wireless world can be classed as non-real time.

Introducing what is perceived as real time services into the wireless world brings many challenges not currently experienced in the wired environment. For example bandwidth, limited footprint/memory in the terminal, charging and billing.

It is therefore important to consider the issues and impacts that surround these types of services when deploying in a wireless world.

The messaging services covered in this section are as follows:

4.2 SMS

The SMS messaging service allows a message to be created on a mobile device irrespective of whether the device is connected to a network or not. Once connected to an appropriate network, the user can send the message to the originators home SMSC, where it is stored until it is possible for the SMSC to deliver the message to the recipient. (please note that it is technically possible to send the message to any SMSC). Because of the short delivery times sometimes experienced by users of the SMS service, it could be perceived as being a real time service. However, 'real time' delivery cannot be guaranteed due to the fact that there is no communications association between the originator and the recipient, only the originator and the SMSC, and therefore the SMS service should not be considered as a 'real time' service.

4.3 MMS

SMS has been very successful messaging service within in the second-generation GSM system. In the third generation mobile system it is envisaged that the Multimedia Messaging Service, MMS, shall succeed this easy to use, non real-time text transmission service. The MMS will allow users to send and receive messages exploiting the whole array of media types available today e.g. text, images, audio, video, while also making it possible to support new content types as they become popular.

As with SMS, the MMS message is created using the application on the device. Again, the device does not have to be connected to a network in order to create a message. Once connected to the network the message can be sent from the device to the originators MMS server, again similar to the SMS implementation. This can be classed as the originating process.

However, the MMS delivery process differs to that of the SMS in that instead of sending the message directly to the recipient, the MMS server forwards the message to the recipient's MMS mailbox. Depending on the architecture, the recipient may be notified that a new MMS message has arrived in their inbox from which the recipient can then connect to their mailbox to retrieve the message or have the message pushed to them.

Unlike SMS where there is a degree of expectancy of a 'real time' service, users may perceive that the service is non real time. Neither the originator nor the recipient perceives that the message will be delivered in real time, more of a service where a message can be deposited and retrieved at the recipients will.

4.4 Instant Messaging

Instant Messaging is becoming popular within the Internet world although interoperability between services is not widely available. The popularity is party due to the attraction of users being able to converse with one another without the need for voice. There are many scenarios where this is an advantage for example noisy areas such as the pit lanes used in F1 motor racing. The expectation of the service from a users viewpoint is to be able to communicate with other users in real time. Therefore the service relies on a communications association between the originator and the recipient in order to meet this expectation. The service is primarily text based, although most services allow for various attachments to be added; however the delivery expectation of the attachment is not consider to be real time. Most applications include access to a 'Presence' service to allow users to see who is available for Instant Messaging, however this is not mandatory. If the recipient is not available then most Instant Messaging services allow for the storage of a message until the recipient becomes available, acting in a very similar manner to that of SMS.

In terms of the originating and delivery process there is a requirement to provide what is perceived as a real time connection between the two parties for the basic transfer of messages between the parties, however for attachments the perception is that these will be delivered in a background mode.

4.5 Chat

Chat has established itself within the Internet environment as a popular service. The service enables people to send text to a central point (chat server) allowing all of those users who are connected to the central point to view the text. Interoperability between 'Chat' rooms is not seen to be necessary within the Internet world as all users have the capability (if not the authorisation) to join the same chat room. However, Chat may evolve into a messaging service that requires 'Chat' rooms to interoperate, but for the foreseeable future this is not a requirement. Chat rooms can be divided into two categories, Private and Public, each providing a very similar service but different in the authorisation of use. The Chat services of today are primarily text based, allowing messages to be sent to all those within the chat room or to selected users. Likewise attachments can be sent but as with the Instant Message service the expected delivery of these is not considered to be 'real time'.

In terms of the originating and delivery process there is a requirement to provide what is perceived as a real time connection between the originator and the recipients.

4.6 Email

Email is used everyday and can be viewed as probably the most popular method of messaging currently available. The architecture for email is well known and established, with protocols that allow interoperability between various email systems. Email is very similar to that of MMS described earlier in that it is a non-real time service where the originator does not rely on the fact the recipient of the message is on-line using the system. The messaging service allows a user to deposit a message in the mailbox of the recipient to be collected/read by the recipient at an appropriate time.

In terms of the originating and delivery process there is no requirements for a real time connection. Neither the originator nor the recipient perceives that the message will be delivered in real time.

4.7 Messaging in the IMS

As 3GPP has developed the concept of IMS it is thought useful to consider how a SIP based IP network can be utilised to provide messaging capabilities. One of the chief characteristics of SIP is its ability to rapidly and efficiently create real-time sessions between groups of users. It therefore appears that SIP based messaging would be a potential candidate to provide the equivalent of “Chat Room” and “Instant Messaging” (IM) type services found on the Internet today.Typical characteristics instant messaging are instant delivery of the messages to the targeted recipient(s) and interaction with presence information where users are able to see who is on-line as well as their status.

A chat room is a "place" where multiple persons can join, follow and contribute to the ongoing discussion and leave the "room" at any time. Chat rooms are more permanent in nature when compared to IM exchanges and may be created by users or service providers. Additionally, chat rooms can be further divided to the private and public chat rooms. Normally, users who are participating in chat room will receive all the messages that are sent by the other participants. Similarly, the users are alsoable to send private messages to the chat room or even privately to some participant.

Unfortunately, the most popular internet based instant messaging services are usually based upon closed and proprietary protocols which has made it impossible for different service providers to allow interoperable messaging between their respective users. Additionally, internet based services do not take into consideration the wireless environment and the needs of operators to provide services that are commercially viable by for example, providing support for charging. This report will further elaborate the essential messaging characteristic of these services and state how they may be enhanced, e.g. operators may be able to create and then advertise chat rooms containing specific content where users who join the room may be charged an ‘entrance’ fee,

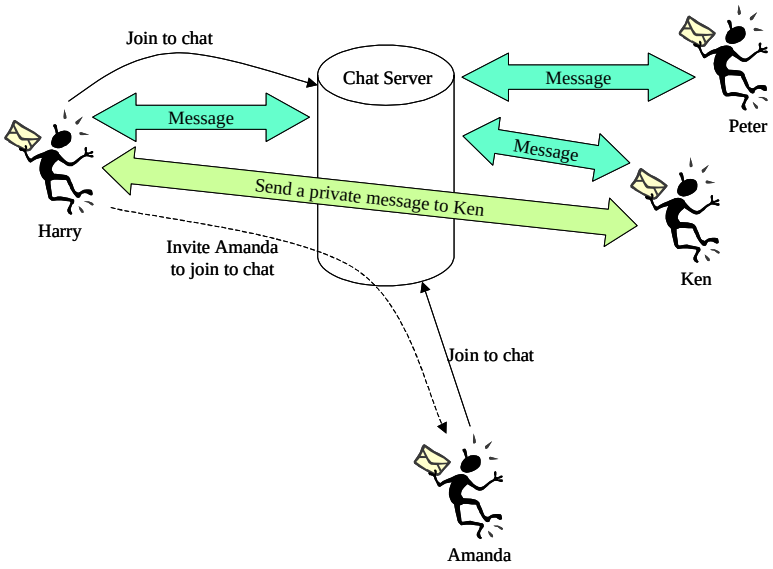

Figure 1. Example IMS messaging service: Chat room

5 IMS Messaging

5.1 Messaging types

Messaging can be divided to two different main classes based on the expectation of the sender. The sender either expects the message to be delivered immediately or he does not care so much whether the message is delivered immediately or later. In the latter (deferred delivery messaging) case, the sender assumes that message will be delivered to the recipient and network utilize store-and-forward capabilities to provide higher probability of reliable delivery or to support delivery time definitions set by the sender.

The immediate case can be further divided to two different sub-classes based on the actions required form the user before he can encage to communication. The user can both send and receive messages without any prior actions or he may be required to join to a messaging session before the message exchange can take place.

The messaging types considered in this report are

- **Immediate messaging**: The sender expects immediate message delivery in (near) real time fashion.

NOTE: Typically, sender is aware of the availability of the recipient(s) (possibly through the use of the Presence service) before sending this type of message as, if the recipient is not available, the message may be discarded or deferred. An immediate message may be deferred by the recipient's network based on the message filtering settings defined by the recipient or by the recipient's IMS service provider.

- **Deferred delivery messaging**: The sender expects the network to deliver the message as soon as the recipient becomes available.

NOTE: The system or the sender may request that the message is delivered at a specified time e.g. earliest time of delivery within the specified message expiry time when the message is discarded.

- **Session based messaging**: The sender(s) and the receiver(s) have to join to a messaging session e.g. chat room, before message exchange can take place.

NOTE: The sender and recipient expect near real time message delivery. Typically, recipients of the session based messaging that are not joined to a group or are not available will not receive the messages. Typically, a sender may send a message to all participants in the messaging session without addressing them individually.

5.2 Use Cases

NOTE: Use cases are not exhaustive, variations are possible

5.2.1 Instant Messaging with immediate delivery

Premise

The user, "Harry" can see from his buddy list that "Jane" is ready to receive messages. Harry wants to send a immediate message to Jane to see if she would like to met up for coffee

Actions

Harry sends a message to Jane and she replies, suggesting that they meet in five minutes at a particular coffee bar.

Considerations

The above scenario shows a successful message transfer between Harry (the sender) and Jane (the recipient). Considerations should be taken when the delivery of the massage can not take place, which could be a network issue (eg due to loss over coverage) or a user choice (eg changes to the profile). The application may then inform Harry that the deliver of the message to Jane has been unsuccessful.

5.2.2 Instant Messaging With “Delivery at a later date”

Premise

This is a similar scenario as for simple instant messaging above in that the user Harry can see from the Buddy list that Jane is unable to receive messages, however Harry decides to send an immediate message t o Jane anyway.

Actions

Harry sends a message to Jane. The system determines that Jane is unable/unwilling to receive the message and indicates to Harry that the message will be delivered at a later date or deleted

Considerations

Harry may chose an alternative messaging service to achieve this.

5.2.3 Sending a document during an instant message exchange.

Premise

Harry sees a model car that he thinks is the one that Jane has been looking for. He sees that she is available, but in a meeting. He wants to know if this is the right model before he buys it.

Actions

Harry sends Jane a message and a photo of the model car. Jane responds with a text message and has not interrupted her meeting.

Considerations

The mechanism used to send the photo does not affect the expectation of the user during the instant message exchange.

5.2.4 Delivery of documents at a later date

Premise

Harry and Jane are chatting about a problem that they are both working on. Harry realises that he has a useful document for Jane to read at a later date. Jane is unable to receive the document now, but wants to collect it from her mailbox at a later date. This is equivalent to someone saying “I’ll e-mail you that document in a minute” when they are having a voice conversation.

Actions

Harry sends Jane a message “I’ll send you a copy of the report to your e-mail so that you can receive it later”. He then sends the document to her e-mail account.

Considerations

5.2.5 Message Filtering

Premise

Harry has an instant message identity that is publicly available. His subscription with the service provider is such that he has a filter set that after a particular time (e.g. 1800) all messages are diverted to a mail box.

Actions

Instant messages sent to Harry are diverted to a mail box from which Harry can retrieve at a later date.

Considerations

Harry may wish to be notified that an instant message has been delivered to his mail box.

5.2.6 Chat Room

Premise

Harry and Jane are chatting about a problem that they are both working on. They realise that they need other colleagues to provide input to the problem.

Actions

Harry creates a messaging session and invites all the co-workers to participate in a discussion.

Considerations

5.2.7 Sending a document during a chat room session

Premise

Harry , Jane and Peter are discussing a place to meet. Harry provides directions in the form of a map that he has available.

Actions

Harry sends a message to Jane and Peter with the attached map. The system determines that Jane is unable to accept the attached map due to for example a rejection by Jane's UE due to lack of memory.

Considerations

The system determines that Jane is unable to accept the attached map due to for example a rejection by Jane's UE due to lack of memory. Jane wishes to retrieve the map at a later time e.g. after she's been able to make more memory available.

5.2.8 Location and Presence Enhanced Messaging

IMS Messaging Clients can utilize location and presence information from the IMS Core Network to enhance the messaging experience.

- At 5 minutes before noon Mark decides he'd like to get together with friends for lunch.
    - Mark looks at the buddy list on his handset to see the status of his friends. After examining location, availability, who's online and who's busy, he chooses Sally.
    - Mark is offered a menu with options to call, IM, MM, or leave voicemail for Sally. Since Sally's status indicates that she's online, he chooses to send an immediate message inviting her to lunch at the Ritz. Sally accepts the invitation by sending a return IM.
- Alternatively, Mark could choose initiate a group chat session, inviting as participants all friends in his buddy list, indicating that only those within a 5 mile radius should be included.
    - Once the chat session is established, Mark then invites the group to lunch, leading to a vigorous exchange of messages between the participants regarding which restaurant they will choose.

5.2.9 IMS Messaging Selects Appropriate Delivery Methods

The IMS Messaging Service can select the appropriate message type depending on the status and preferences of the recipient, and upon the preferences of the sender.

- Sally is flying to New York City. Jason is already in NYC. Sally's phone is offline.

- Jason sends a message – it can not be delivered until Sally lands so the IMS Messaging Service automatically stores the messaging, waiting for Sally to be available. When Sally lands and turns on her phone the message is delivered to Sally. "Meet us at Joe's Restaurant".

- Having seen Jason's message. Sally needs directions. She replies to Jason's message. She sends IM to Jason - "Where's the Bar?". Jason is on home on his PC. The message routed to the IMS Messaging client running on the home PC. Jason replies with directions + Map from his home PC. Sally gets the message with the map and is on her way.

- Alan carries a phone and a PDA. He sets a rule that multimedia messages (messages with attachments) be delivered to his PDA, but all text messages be delivered to his phone.

- Vic has a pager, phone and a PC. For certain classes of important messages notification is sent to all devices. Vic can choose to pick up message from most relevant device.

5.2.10 IMS Messaging Service Provides Added Value to Messages Through Network Based Services

The IMS Messaging Service provides users a rich filtering mechanism that enables protection from unwanted messages and control over the messaging environment. IMS also enables service providers and end-users to save their messages for future reference.

- Lisa sets up message filters that choose to only deliver messages from co-workers and those friends she's placed on her buddy list. All other messages are refused by the service.

- Lionel is at work and IMs with Jason who mentions a URL. Later, at home, Lionel wants to retrieve and goes back to that IM thread to get the URL.

- Mark joins group that is in progress. He wants to see the conversation thread from before he joined. Mark chooses to view the previous 25 minutes of the conversation to catch up on what is being discussed.

5.2.11 IMS Messaging Support for Value Added Service Providers

The IMS Messaging Service enables Value Added Service offerings. The Value Added Service Providers use user profile information in addition to presence and location to provide personalized service.

- FAN Club Services (ie: Swarming) - Betsy is a member of a famous personality's spotters group chat based service.

  - Updates on location and photos of the action at those location are sent to the group as submitted by chat participants. Betsy only hears about these activities if she is within 5 miles.

  - Betsy is in central London and doesn't get messages about his activities at the football match on the outskirts of London (too far away).

  - Later – He appears at a trendy central London nightclub and Betsy is alerted and automatically placed into the chatroom. She swarms.

5.3 Interaction with other Features

5.3.1 MMS

Deferred messaging is already supported within 3GPP systems in the form of MMS. In some use cases the sender deliberately selects which messages should be deferred, or agrees to defer the message when the network is unable to deliver. In either case, a solution should be found that allows messaging within the IMS to interact with the MM S, so that Deferred messaging is supported by the existing capabilities of the MMS.

MMS supports the conversion of media when the sent format is not supported by the recipient's UE. This may be a useful feature in immediate ,messaging if the conversion can be done in "real time". The capability which detects the UE capabilities and converts the media should be a common capability for IMS messaging and MMS.

5.3.2 IMS Group Management

Chat rooms support a group of users who are participating or can participate in a “chat session”. IMS messaging should make use of the IMS Group Management [5] capability for the support of multiparty sessions.

5.3.3 Presence

IMS messaging should interact with the Presence capability being defined for 3GPP [6].

5.4 Messaging Interoperability

It is vital that the interface between messaging systems should be standardised in order to allow messages to be transported between PLMNs, and to be correctly rendered both by different terminals types and devices from different manufacturers.

Figure 2 below illustrates the scope of this report and how messaging service residing in the IMS should interact with 2G networks and the Internet. It is envisaged that IMS messaging will be a way to allow messaging between a varieties of different network types. For example, it should be possible for PLMN B to create a chat room that can be accessed via users of other 3G PLMNs, 2G PLMNs and on the Internet. However, unlike many messaging systems found on the Internet, the interface between PLMNs should allow for a complete set of features to allow the controlled exchange of important messaging related information such as presence and charging data.

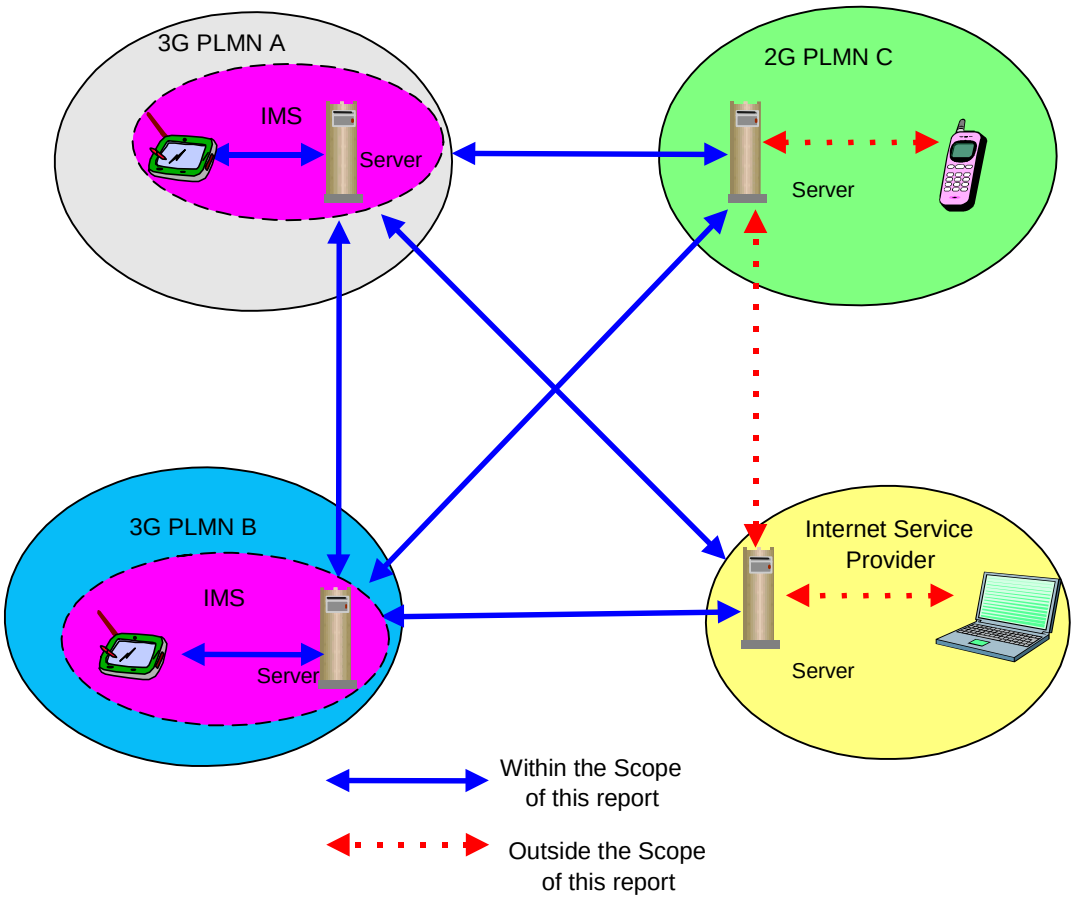

Figure 2. IMS messaging overview

In order to achieve the required level of interoperability the following should be considered:

a) content formats;

b) content adaptation;

c) transport protocols;

d) user addressing formats; and

e) interworking functions.

6 Immediate messaging requirements

6.1 General requirements

Network operators have different network configuration and commercial requirements. IMS messaging shall be supported in a manner that meets the operator's IMS requirements. Thus, an identified set of functionalities and formats shall be standardized to ensure interoperability across networks and terminals to support IMS messaging.

The following general requirements shall be supported.

a) There shall be a mechanism to differentiate between messages of different messaging types.

b) It shall be possible to use a single address to identify the recipient irrespective of message type.

c) Within the capabilities of networks and terminals, the user shall be able to experience consistent access to IMS Messaging regardless of the access network e.g. 3GPP systems, fixed networks, the Internet.

d) IMS Messaging shall support a minimum set of functionality and message formats to ensure interoperability.

e) IMS Messaging shall provide a minimum set of supported formats to ensure full interoperability between different terminals and networks (e.g. JPEG for pictures, MP3 for audio, MPEG for motion pictures).

f) IMS Messaging shall support backwards compatibility.

g) IMS messaging shall be able to support the capability for the terminal and network to take account of the capability of the user's terminal.

h) IMS Messaging shall be able to support the capability of the network to take account of the availability, changes of the state of availability of the terminal (e.g. store/discard messages if the recipient is not available).

i) It shall be possible to store in the ISIM a number of sets of configuration information to allow access to IMS messaging services. One of these sets of configuration information is preset by the issuer of the ISIM. Such preset configuration information set shall only be configurable by issuer of the ISIM. The preset configuration information is selected unless otherwise specified by the user. It shall be possible to retain the configuration information when the UICC is used in different terminals.

j) It shall be possible to send and receive immediate messages without prior establishing a messaging session.

k) It shall be possible for the recipient to define the treatment of immediate messages that cannot be delivered immediately to the recipient.

6.2 Message content requirements

Following requirements are specific to content delivered within all messaging types.

a) Content size shall not be limited by technology.

b) It shall be possible to carry different media including text, images, video and audio in all messaging types. Media types shall be MIME encoded.

c) Content formats shall be defined so that they enable interworking with 3GPP and Internet messaging solutions.

d) It shall be possible to compose message of either a single medium (e.g. voice) or multi-media (e.g. voice and video). The IMS messaging service shall be able to support a request for media sequencing.

6.3 Management requirements

The following management requirements shall be supported by IMS messaging.

a) IMS Messaging shall be able to support a request from the IMS service provider to enable/disable message delivery and submission.

b) IMS Messaging shall be able to support a request from the user to enable/disable message delivery and submission.

c) IMS Messaging shall be able to support the user to manage his user service profile related to IMS messaging (e.g. customize his messaging environment within the capabilities of the terminal, network and messaging application). This could be unconditional or conditional e.g. depending on roaming conditions or operator restrictions.

Editor's note: Some of the following requirements may be fulfilled with IMS group management procedures.

d) It shall be possible for an authorized user or an IMS service provider to create an address that can be used for session based messaging (e.g. a chat room).

e) It shall be possible for the creator of the address or messaging session administrator to control who is allowed to participate in the messaging session.

f) It shall be possible for the IMS service provider or the creator of the address to delete the address that is used for session based messaging (e.g. close a chat room).

g) It shall be possible for the administrator of the messaging session (to set properties related to the messaging session (e.g. the chat room name, topic, maximum number of active users).

Editor's note: The following sentences used throughout this section need to be revised and possibly improved:

- "create an address that can be used for session based messaging"
- "creator of the address"

6.4 Message delivery requirements

Following requirements define the message delivery in IMS messaging. The requirements apply to all messaging types unless otherwise stated.

a) Message delivery shall be immediate in immediate and session based messaging i.e. messages are transported by the IMS system to the recipient's terminal (without notifications) subject to message filtering settings defined by the recipient or by the recipient's IMS service provider.

b) Immediate and session based messages shall not be stored by the network. If supported by the recipient's network as an application option immediate and session based messages may be stored in the recipients network.

c) It shall be possible for the sender to receive delivery acknowledgements (success/failure) for sent messages.

6.5 Storage requirements

The following storage requirements shall be supported.

a) IMS Messaging shall allow an IMS Messaging service provider to configure IMS Messaging in such a way that one, several or all incoming IMS Messaging of a particular user be stored persistently in a network based repository.

b) IMS Messaging shall allow an IMS Messaging service provider to configure IMS Messaging in such a way that one, several or all submitted IMS Messaging of a particular user be stored persistently in a network based repository.

c) IMS Messaging shall be possible for a sender to request to persistently store a sent IMS Message in a network based repository at the time of sending if IMS service provider provides such application level service.

d) IMS Messaging shall be possible for the receiver to request to persistently store a deferred delivery message for which he received a notification in a network based repository if IMS service provider provides such application level service.

e) IMS Messaging shall be able to support a request from a user to retrieve one or more messages that are stored in a network based repository.

f) IMS Messaging shall be able to support a request from a user to delete one or more messages that are stored in a network based repository.

g) IMS Messaging shall be able to support a request from a user to forward one or more messages that are stored in a network based repository to another destination.

h) IMS Messaging shall be able to support a request from a user to view the list of messages and message related attributes, such as sender, recipient, subject and date/time, in a network based repository.

i) IMS Messaging shall be able to support a request from a user to upload one or more IMS Messaging into a network based repository for persistent storage.

6.6 User privacy requirements

Following requirements define user privacy in IMS messaging. These requirements apply to all messaging types.

a) It shall be possible for the recipient to see the public ID of the sender of the message unless the sender has requested to hide it.

b) It shall be possible for the sender of the message to request to hide its public ID from the recipient (anonymous sender).
The sender's public ID shall not be delivered to the recipient. The capability of public ID hiding is an IMS service provider and legislation issue and it may or may not be available. If the service is not available the message shall not be delivered to the recipient.

c) It shall be possible for the sender to use nickname when sending messages.
In case of nickname the recipient shall only be able to see the nickname but not the real address from which the message came from. It shall be possible to use nicknames for public and private messages. It shall be possible for the recipient to reply to the message sent with a nickname.

6.7 Message Filtering

It shall be possible for a subscriber to set up, modify, and delete filters in the network of the subscriber's IMS service provider, in order to control the treatment of a message by the network when either an immediate or deferred message is received when the subscriber is either unavailable or when the subscriber does not currently want to receive messages. The filters shall also support the ability of the subscriber to specify the maximum size and type of message content etc that they are or are not willing to accept. The filters shall also support the ability of the subscriber to block (and unblock) messages from specific senders or anonymous senders.

Following specific requirements define the message filtering capabilities of the recipient.

a) It shall be possible to define specific message treatment based on following criteria

   1) sender address (including anonymous senders);

   2) message size;

   3) message class (e.g. advertisement, private….);

   4) message priority;

   5) message content type (e.g. video, audio….)

   6) message content format (e.g. mpeg, jpeg….);

   7) message type (e.g. immediate message, deferred delivery message);

8) message subject.

b) It shall be possible to specify the following message treatments in a filter:

1) Block the delivery of the message content.

2) Store the message content and notify recipient,

3) Store the message content for a specific time or until the recipient requests delivery.

4) Store and push the message content to recipient when available.

5) Redirect the message to another address (e.g. a server that filters message content for SPAM etc)

NOTE: The filtering of SPAM and offensive content etc although an important issue that was of interest to a number of parties, is outside the scope of this report as an application/service issue.

The IMS service provider shall also be able to set and control the filter settings either on behalf of the subscriber or based on policy.

6.8 Addressing requirements

It shall be possible to use a single address to identify the recipient irrespective of message type. The single address shall be either a SIP URL, a network address identifier (NAI as defined in RFC2486 [4]) or a MSISDN.

IMS messaging shall be based on existing IMS address resolution and routing mechanisms.

Editor's note: Address translation/mapping requires more analysis.

7 Session based messaging requirements

7.1 General requirements

Network operators have different network configuration and commercial requirements. IMS messaging shall be supported in a manner that meets the operator's IMS requirements. Thus, an identified set of functionalities and formats shall be standardized to ensure interoperability across networks and terminals to support IMS messaging.

The following general requirements shall be supported.

a) There shall be a mechanism to differentiate between messages of different messaging types.

b) It shall be possible to use a single address to identify the recipient irrespective of message type.

c) Within the capabilities of networks and terminals, the user shall be able to experience consistent access to IMS Messaging regardless of the access network e.g. 3GPP systems, fixed networks, the Internet.

d) IMS Messaging shall support a minimum set of functionality and message formats to ensure interoperability.

e) IMS Messaging shall provide a minimum set of supported formats to ensure full interoperability between different terminals and networks (e.g. JPEG for pictures, MP3 for audio, MPEG for motion pictures).

f) IMS Messaging shall support backwards compatibility.

g) IMS messaging shall be able to support the capability for the terminal and network to take account of the capability of the user's terminal.

h) IMS Messaging shall be able to support the capability of the network to take account of the availability, changes of the state of availability of the terminal (e.g. store/discard messages if the recipient is not available).

i) It shall be possible to store in the ISIM a number of sets of configuration information to allow access to IMS messaging services. One of these sets of configuration information is preset by the issuer of the ISIM. Such preset configuration information set shall only be configurable by issuer of the ISIM. The preset configuration

information is selected unless otherwise specified by the user. It shall be possible to retain the configuration information when the UICC is used in different terminals.

j) It shall be possible for the subscribers to join to a session e.g. chat room.

k) It shall be possible for the subscribers to leave a session e.g. chat room.

l) It shall be possible to send a message to all the participants of a messaging session without specifying the individual participant's addresses or using a message delivery list.

m) It shall be possible to invite new participants to the existing messaging session.

1) The invitations shall be semi permanent i.e. it is not required that invitee will act immediately.

2) It shall be possible to cancel the invitation by the inviter.

3) It shall be possible for the inviter to define the validity period of the invitation.

4) It shall be possible for the invitee to see the originator of the invitation unless the inviter has required hiding his public ID.

5) It shall be possible for the inviter to define the messaging session to which the invitation is made.

6) It shall be possible for the invitee to identify the messaging session to which he was invited.

n) It shall be possible for the recipient of the message to identify from which messaging session the message came from (for both public and private messages).

o) It shall be possible for the recipient to identify the sender (unless the sender has required hiding its public ID) of the message in addition to the messaging session from which the message came from.

p) It shall be possible for the sender to send a private message for a selected recipient.

q) It shall be possible for the recipient to determine if the message was send as a private message within a messaging session.

r) It shall be possible for the subscriber to request the message session properties e.g. list of active members.

s) It shall be possible to utilize IMS Group Management [3] as appropriate.

Editor's note: Session based messaging may need new requirements to enable fetching message log e.g. after a loss of radio coverage.

7.2 Message content requirements

Following requirements are specific to content delivered within all messaging types.

a) Content size shall not be limited by technology.

b) It shall be possible to carry different media including text, images, video and audio in all messaging types. Media types shall be MIME encoded.

c) Content formats shall be defined so that they enable interworking with 3GPP and Internet messaging solutions.

d) It shall be possible to compose message of either a single medium (e.g. voice) or multi-media (e.g. voice and video). The IMS messaging service shall be able to support a request for media sequencing.

7.3 Management requirements

The following management requirements shall be supported by IMS messaging.

a) IMS Messaging shall be able to support a request from the IMS service provider to enable/disable message delivery and submission.

b) IMS Messaging shall be able to support a request from the user to enable/disable message delivery and submission.

c) IMS Messaging shall be able to support the user to manage his user service profile related to IMS messaging (e.g. customize his messaging environment within the capabilities of the terminal, network and messaging application). This could be unconditional or conditional e.g. depending on roaming conditions or operator restrictions.

Editor's note: Some of the following requirements may be fulfilled with IMS group management procedures.

d) It shall be possible for an authorized user or an IMS service provider to create an address that can be used for session based messaging (e.g. a chat room).

e) It shall be possible for the creator of the address or messaging session administrator to control who is allowed to participate in the messaging session.

f) It shall be possible for the IMS service provider or the creator of the address to delete the address that is used for session based messaging (e.g. close a chat room).

g) It shall be possible for the administrator of the messaging session (to set properties related to the messaging session (e.g. the chat room name, topic, maximum number of active users).

Editor's note: The following sentences used throughout this section need to be revised and possibly improved:

- "create an address that can be used for session based messaging"
- "creator of the address"

7.4 Message delivery requirements

Following requirements define the message delivery in IMS messaging. The requirements apply to all messaging types unless otherwise stated.

a) Message delivery shall be immediate in immediate and session based messaging i.e. messages are transported by the IMS system to the recipient's terminal (without notifications) subject to message filtering settings defined by the recipient or by the recipient's IMS service provider.

b) Immediate and session based messages shall not be stored by the network. If supported by the recipient's network as an application option immediate and session based messages may be stored in the recipients network.

c) It shall be possible for the sender to receive delivery acknowledgements (success/failure) for sent messages.

7.5 Storage requirements

The following storage requirements shall be supported.

a) IMS Messaging shall allow an IMS Messaging service provider to configure IMS Messaging in such a way that one, several or all incoming IMS Messaging of a particular user be stored persistently in a network based repository.

b) IMS Messaging shall allow an IMS Messaging service provider to configure IMS Messaging in such a way that one, several or all submitted IMS Messaging of a particular user be stored persistently in a network based repository.

c) IMS Messaging shall be possible for a sender to request to persistently store a sent IMS Message in a network based repository at the time of sending if IMS service provider provides such application level service.

d) IMS Messaging shall be possible for the receiver to request to persistently store a deferred delivery message for which he received a notification in a network based repository if IMS service provider provides such application level service.

e) IMS Messaging shall be able to support a request from a user to retrieve one or more messages that are stored in a network based repository.

f) IMS Messaging shall be able to support a request from a user to delete one or more messages that are stored in a network based repository.

g) IMS Messaging shall be able to support a request from a user to forward one or more messages that are stored in a network based repository to another destination.

h) IMS Messaging shall be able to support a request from a user to view the list of messages and message related attributes, such as sender, recipient, subject and date/time, in a network based repository.

i) IMS Messaging shall be able to support a request from a user to upload one or more IMS Messaging into a network based repository for persistent storage.

7.6 User privacy requirements

Following requirements define user privacy in IMS messaging. These requirements apply to all messaging types.

a) It shall be possible for the recipient to see the public ID of the sender of the message unless the sender has requested to hide it.

b) It shall be possible for the sender of the message to request to hide its public ID from the recipient (anonymous sender).
The sender's public ID shall not be delivered to the recipient. The capability of public ID hiding is an IMS service provider and legislation issue and it may or may not be available. If the service is not available the message shall not be delivered to the recipient.

c) It shall be possible for the sender to use nickname when sending messages.
In case of nickname the recipient shall only be able to see the nickname but not the real address from which the message came from. It shall be possible to use nicknames for public and private messages. It shall be possible for the recipient to reply to the message sent with a nickname.

7.7 Message Filtering

It shall be possible for a subscriber to set up, modify, and delete filters in the network of the subscriber's IMS service provider, in order to control the treatment of a message by the network when either an immediate or deferred message is received when the subscriber is either unavailable or when the subscriber does not currently want to receive messages. The filters shall also support the ability of the subscriber to specify the maximum size and type of message content etc that they are or are not willing to accept. The filters shall also support the ability of the subscriber to block (and unblock) messages from specific senders or anonymous senders.

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   3) message class (e.g. advertisement, private….);

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   5) message content type (e.g. video, audio….)

   6) message content format (e.g. mpeg, jpeg….);

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b) It shall be possible to specify the following message treatments in a filter:

   1) Block the delivery of the message content.

   2) Store the message content and notify recipient,

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4) Store and push the message content to recipient when available.

5) Redirect the message to another address (e.g. a server that filters message content for SPAM etc)

NOTE: The filtering of SPAM and offensive content etc although an important issue that was of interest to a number of parties, is outside the scope of this report as an application/service issue.

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IMS messaging shall be based on existing IMS address resolution and routing mechanisms.

Editor's note: Address translation/mapping requires more analysis.

8 Security

The user shall be able to use IMS messaging and access messages in a secure manner. It shall be possible for the contents of messages to be read only by the intended recipient(s). A recipient shall be informed of the reliability of the identity of the sender in case the sender has authorised his identity to be transmitted.

The integrity of messages during transit shall be assured to extent of the network capabilities.

IMS Messaging shall be intrinsically resistant to attempts of malicious or fraudulent use.

The "Security Threats and Requirements" specified in 21.133 shall not be compromised.

9 Charging

Charging for IMS messaging shall be based on existing IMS charging mechanisms as appropriate.

IMS Messaging shall be able to support various charging models, including:

a) sender only pays;

b) both sender and recipient pay their respective charges for message delivery;

c) recipient pays; and

d) sender pays for reply message on a per message basis in deferred delivery messaging type.

IMS Messaging shall be able to support different charging approaches:

a) volume based charging;

b) QoS based charging;

c) service based charging;

d) number of messages sent and/or received; and

e) offline charging or/and online charging.

IMS Messaging shall be able to support various charging mechanisms. The following charging characteristics may be considered:

a) message content type and length;
Message content type should be declared using a standardised declaration [the note may need to be moved to a different section e.g. message filtering].

b) roaming conditions;

c) indication of charging;
It is indicated to the recipient prior to the recipient downloading a deferred delivery message whether the sender or the recipient is expected to pay for the message.

d) prepaid subscriptions;

e) time when the message is sent;

f) time when the message is delivered;
[FFS, “delivered” could indicate message stored, message read, message received by the terminal and so on…]

g) message origin and destination;

h) access network employed; and

i) the charging information shall describe the amount of data sent and received to and from the external data network [Note: this is introduced to take into account the network(s) transited by message].

10 Interworking

Editors note: This chapter covers interworking requirements, especially those related to the interaction between IMS messaging and existing messaging services.

It should be possible for the IMS messaging subscriber to send/receive messages to/ from subscribers of 3GPP defined messaging services (SMS, EMS, MMS). Optionally, it should be possible to send/receive messages to/from users of fixed Internet messaging service (e.g. SMTP and SIMPLE based services).

11 Deferred delivery messaging requirements

Deferred delivery messaging requirements shall be able to provide the same functionality as specified in the MMS stage 1 3GPP TS 22.140 [2]. For the purposes of the requirements for IMS messaging in this report, the terminology “MMS” in [2] maps to “IMS messaging” and the terminology “MM” in [2] maps to “message”.

In addition to the requirements stated in [2] it is required, that IMS addressing is supported i.e. it shall be possible to send multimedia messages to an IMS public identity of a subscriber.

NOTE: It is proposed that further work on the requirements on deferred messaging is done in [2].

Annex A (informative): Change history

Change history											
TSG SA#	**SA Doc.**	**SA1 Doc**	**Spec**	**CR**	**Rev**	**Rel**	**Cat**	**Subject/Comment**	**Old**	**New**	**Work Item**
			ab.cde					Produced during MMS SWG meeting 8th-12th April, Sophia Antipolis, France		0.0.0	IMSM
		S1-020745	22.940					Initial content provided to the report	0.0.0	0.1.0	IMSM
		S1-020937	22.940					Major changes to message types and storage requirements in general requirements subclause	0.1.0	0.2.0	IMSM
			22.940					Major changes throughout the document	0.2.0	0.3.0	IMSM
		S1-021237	22.940					Number of revisions throughout the report	0.3.0	0.4.0	IMSM
			22.940					Major restructuring, creating more independent clauses on each messaging type	0.4.0	0.5.0	IMSM