

## **Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Overview of Messaging Services**

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Reference

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## Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN).

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## Introduction

There are many types of messaging in common use today, both as Telecommunications and Internet services, and the present document provides an overview of the different types of messaging. ETSI has specified Short Message Services and Multi-Media Messaging Services that may be deployed in different scenarios and networks. The present document describes some of the scenarios to provide guidance to manufacturers, users and network operators of the applicability of the various ETSI service specifications.

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## 1 Scope

The present document describes some of the different types of messaging (based on TR 122 940 [1]) and provides informative guidance on the areas of application of the Short Message Services and Multi-Media Messaging Services specified by ETSI. The present document does not provide guidance on the services in mobile environments (e.g. GSM). The present document does not specify the services and does not provide service requirements.

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## 2 References

For the purposes of this Technical Report the following references apply:

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

- [1] ETSI TR 122 940 (V7.0.0): "Universal Mobile Telecommunications System (UMTS); IP Multimedia Subsystem (IMS) messaging; Stage 1 (3GPP TR 22.940 version 7.0.0 Release 7)".
- [2] ETSI TS 122 340 (V7.0.0): "Universal Mobile Telecommunications System (UMTS); IP Multimedia Subsystem (IMS) messaging; Stage 1 (3GPP TS 22.340 version 7.0.0 Release 7)".

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## 3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

3GPP	3rd Generation Partnership Project
GSM	Global System for Mobile
IM	Instant/Immediate Message
IMS	IP Multimedia Subsystem
IP	Internet Protocol
ISDN	Integrated Services Digital Network
MM	Multimedia
MMS	Multimedia Messaging Service
MM-TE	Multimedia Message Terminal Equipment
NGN	Next Generation Network
PSTN	Public Switched Telephone Network
SIP	Session Initiation Protocol
SMS	Short Message Service
SM-SC	Short Message Service Centre
SM-TE	Short Message Terminal Equipment
UMTS	Universal Mobile Telecommunication System
W-LAN	Wireless-Local Area Network

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## 4 Messaging services

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, although it can now be found in some fixed networks, whereas Instant Messaging has been designed for a wired environment, although again some mobile networks have implemented Instant Messaging type services. 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 clause investigates current messaging services and examines the expectations and differences between them.

In summary, this clause highlights the important fact that services where the message is delivered 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.

NGN provides a convergence between the fixed and mobile (wired and wireless) worlds, and therefore needs to support both real time and non-real time messaging services.

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

The following clause provide a brief description of the more common messaging services that can be found in the market place today.

## 4.1 Instant Messaging

Instant Messaging is becoming popular within the Internet world although interoperability between services is not widely available. The popularity is partly 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.

## 4.2 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 authorization) 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 authorization 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.

## 4.3 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 in that it is a non-real time service where the originator does not rely on the fact that 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.

## 4.4 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 originator's home SM-SC, where it is stored until it is possible for the SM-SC to deliver the message to the recipient. (please note that it is technically possible to send the message to any SM-SC). 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 SM-SC, and therefore the SMS service should not be considered as a "real time" service. SMS has already been described for use in a fixed (wired) environment.

## 4.5 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. MMS has already been described for use in a fixed (wired) environment.

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 originator's 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 recipient's will.

## 4.6 Messaging in the IMS

3GPP have developed the concept of IMS, which includes messaging capabilities in a SIP based IP network. One of the chief characteristics of SIP is its ability to rapidly and efficiently create real-time sessions between groups of users. 3GPP therefore propose a SIP based messaging as a potential candidate to provide the equivalent of "Chat Room" and "Instant Messaging" (IM) type services found on the Internet today. Typical characteristics of 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 also able 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. The present document 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".

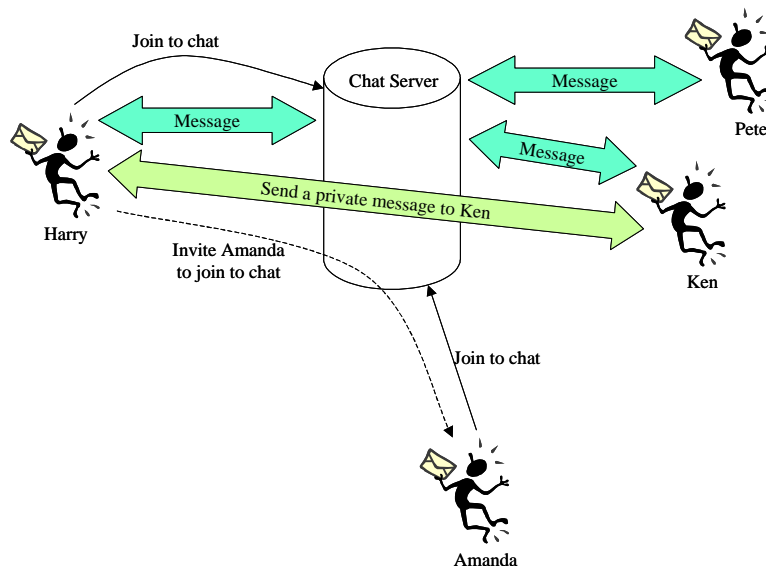


Figure 1: Example IMS messaging service: Chat room

TR 122 940 [1] also provides a summary of current messaging standardization.

## 5 IMS messaging

3GPP have defined three categories into which all messaging services can be placed. These categories are as follows.

### 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 a message will be delivered to the recipient by the 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 from the user before they can engage in communication. The user can both send and receive messages without any prior actions or they may be required to join to a messaging session before the message exchange can take place.

The messaging types considered are:

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

NOTE 1: Typically, the 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 2: 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 messages exchange can take place.

NOTE 3: 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.

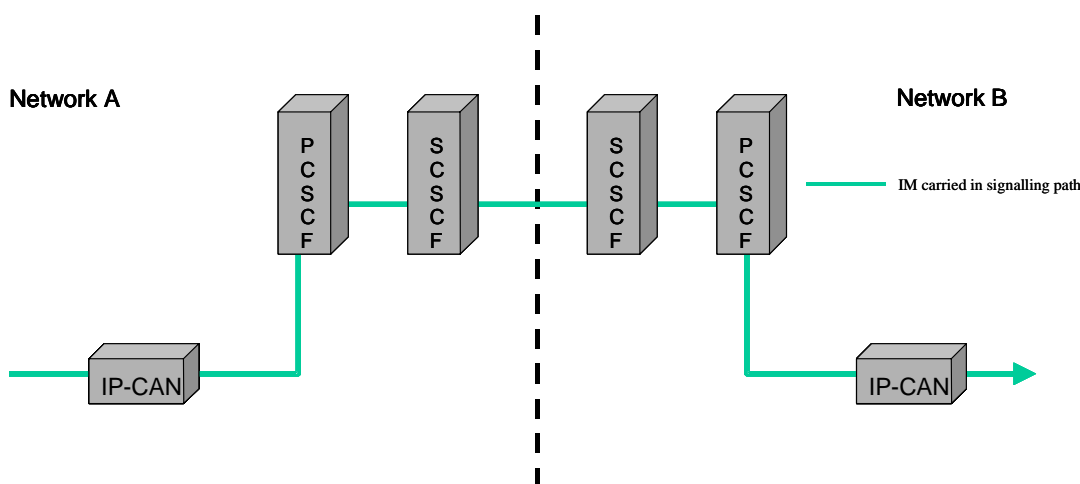
The service requirements for the support of Immediate and Session based Messaging in NGN are provided in TS 122 340 [2].

## 5.2 Messaging architecture

This clause primarily concentrates on the architecture necessary to support those services that are classed as Immediate Messaging and Session Based Messaging.

### 5.2.1 Immediate Messaging Architecture

Consider figure 2:



**Figure 2: Use of Call Control for Immediate Messaging**

This example works on the principle that in general, Immediate Messaging is used for sending short messages and therefore does not require large amounts of bandwidth, which is important when the access network maybe restricted, for example UMTS, W-LAN. Therefore, it is feasible that the path used for call control (SIP messaging), commonly referred to as the "Signalling" channel, could be used to carry "Immediate Messaging" type communications. Further study would be required as to the maximum size of the message that could be transferred to ensure that the "real time" perception is maintained, but since the SIP protocol is being used within the IMS it seems appropriate that it is considered as a possible solution.

However, it is noted that on some occasions users transfer attachments during immediate messaging, however the user's expectation is that these attachments are not delivered in "real time" as perceived for the message. Therefore, attachments would not be considered as messages carried by the same path as the "Immediate Message". Instead it is suggested that a separate media path is established for the transfer of such a file. This is shown in figure 3.

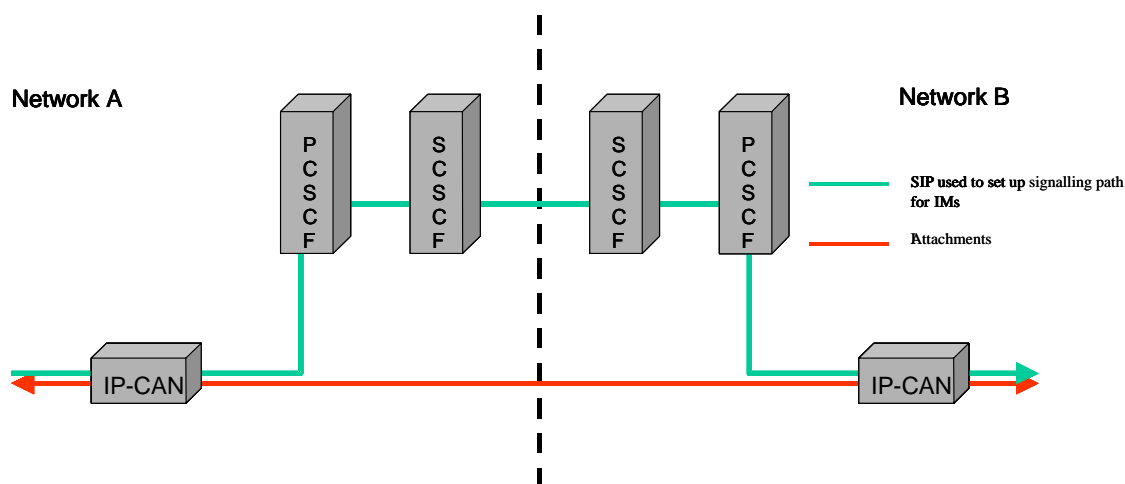


Figure 3: Use of Media Path for Immediate Messaging Attachments

## 5.2.2 Session Based Architecture

When using a messaging service that can be categorized as a "Session Based" service, such as the Instant Message service, the user's expectation is that the communication between themselves and the recipient is "real time". To meet this expectation it is important to have a communication association between the originator and the recipient. The following is an example of how this could be achieved.

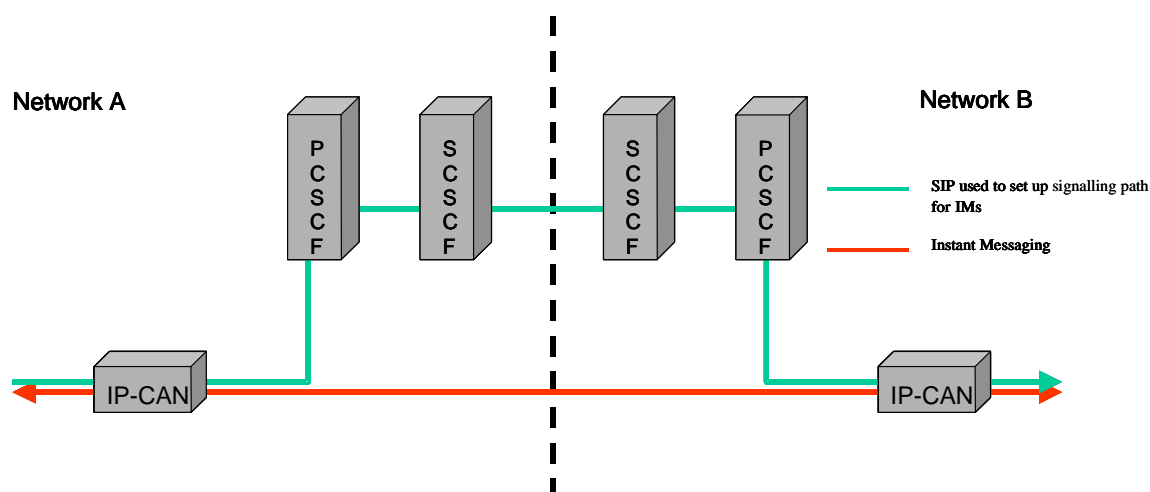


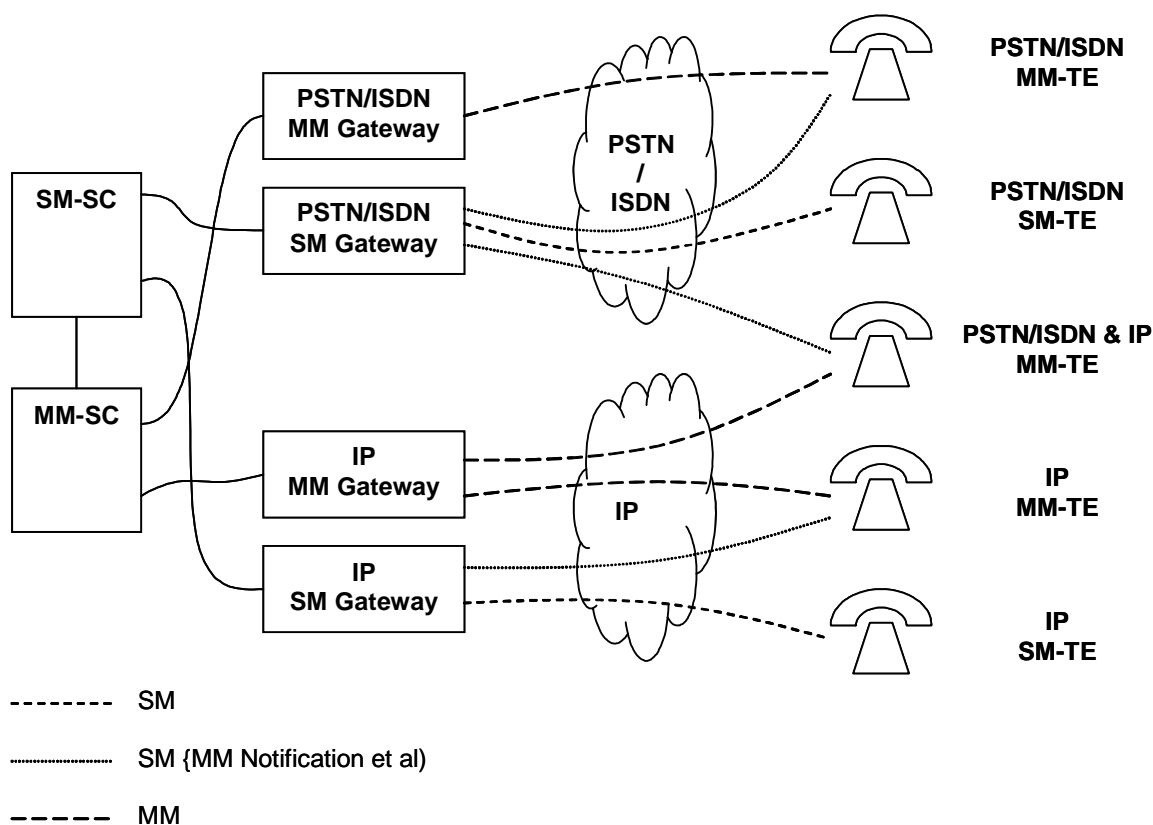
Figure 4: SIP Messaging within the IMS

In this example the SIP messaging within the IMS is used to set-up a Session between the originator and the recipient. Each terminal has an Instant Message application capable of creating messages in a standardized way to ensure interoperability with other terminals that also have the same ability. Once the media path is established the service is effectively end-to-end.

# 6 SMS and MMS for fixed line customers

## 6.1 Overview of Scenarios

The popularity of SMS and MMS, as mobile services, has been extended to fixed line customers through several ETSI specifications. This clause provides an overview of the scenarios supported by ETSI, and an introduction to the service specifications (Stage 1, descriptions) for these scenarios.



**Figure 5: SMS and MMS in fixed networks**

Whilst the basic service capability of delivering a short message (for SMS) or a multimedia message (MMS) remains the same for all the scenarios, the capabilities offered by the access technologies (and the terminal equipment that can be connected) provides restrictions that are necessarily reflected in the service descriptions.

Figure 5 shows an example scenario that demonstrates the use of both SMS and MMS using different access types and terminal types.

NOTE: The stage 1 documents relevant to the access types and terminal types in figure 5 can be found in clause 6.2.

## 6.2 Stage 1 service descriptions

Table 1 provides the stage 1 service descriptions for each of the scenarios considered within ETSI.

**Table 1: Stage 1 Service Descriptions**

<b>Service</b>	<b>Access Type</b>	<b>Terminal Type</b>	<b>Specification</b>
SMS	PSTN/ISDN	SM-TE	ES 201 986
MMS	PSTN/ISDN	MM-TE	ES 202 314-2
MMS	Combined PSTN/ISDN & broadband access (xDSL)	MM-TE	ES 202 314-8
SMS	IP (NGN)	SM-TE	TS 102 507
MMS	IP (NGN)	MM-TE	TS 102 508

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## History

<b>Document history</b>		
V1.1.1	October 2006	Publication