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Short Message Service - ABSTRACT from ETSI-ES 201 912

Introduction

The Short Message Service (SMS) is a service that allows text messages to be sent and received. The present document specifies protocols to provide this service on the fixed network. The transmission of messages of up to 160 characters is guaranteed, although much longer messages are possible.

The protocols specified in the present document support a User Based Solution (UBS), where messages are transported via a Short Message Service Centre (SMSC) using a normal voice band call through the network using in band signalling. SMS messages are sent via the SMSC using a **store-and-forward** principle.

The protocols specified in the present document provide a reliable service that ensures correct delivery of SMS messages and also allows the originating user to verify that an SMS has been correctly received by the receiving terminal.

The provider of the short message service does not necessarily have to be the operator of the public telecommunications network. The Short Message Service does require the **CLIP** function to be implemented in PSTN/ISDN[1]……..

The present document specifies two different protocols to provide the SMS over PSTN/ISDN. Both protocols offer the opportunity to exchange Short Messages with other networks, e.g. GSM and with other services, e.g. Email, Fax.

Each protocol has its advantages; the service provider can select which protocol to implement:

- ✓ **Protocol 1**:
  has the advantage of being fully compliant with the GSM SMS service.
- ✓ **Protocol 2** :
  has the advantage that it specifically focuses on the residential fixed network environment.

Functional description of User Based Solution

Figure 1 gives an overview of the system architecture of SMS in the PSTN/ISDN. The system consists of a Short Message Terminal Equipment (SM-TE), a Short Message Service Centre (SM-SC) and the PSTN/ISDN.

The SM-TE shall be connected to the network via a PSTN or an ISDN access.……

…It is up to the SM-SC to provide interconnection to other networks (e.g. GSM).[2]

The SM-SC architecture is out of the focus of the present document.

To send and receive Short Messages a voice-band communication path is established in the PSTN/ISDN between the SM-TE and SM-SC using basic call control procedures according to the related access types.

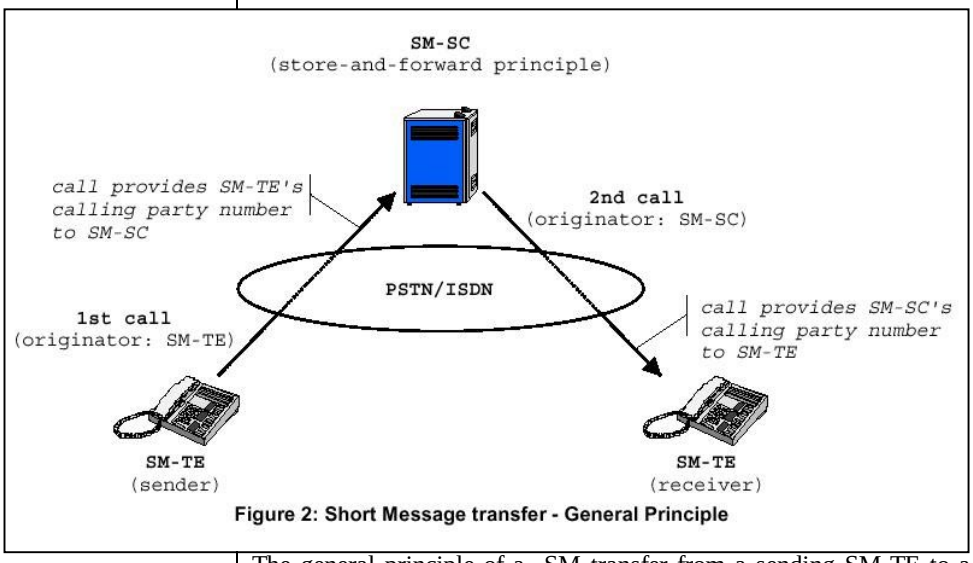

Figure 2: Short Message transfer - General Principle

The general principle of a SM transfer from a sending SM-TE to a receiving SM-TE is depicted in figure 2.

The SM transfer is split up into two steps, the SM submission (transfer of a SM from the 'sender' to the SM-SC) and the SM delivery (transfer of a SM from the SM-SC to the 'receiver').

In the first step (SM submission), the SM-TE establishes a call to the SM-SC to submit the SM to the SM-SC which acts following the **store-and-forward** principle. As marked in figure 2, the network shall provide the caller ID (the CLI) of the SM-TE to the SM-SC. The SM-SC uses this information to identify the SM-TE. Furthermore, the caller ID information may be used for billing purposes.

After the voice band connection between SM-TE and SM-SC has been established, the end-to-end SM data transfer phase is entered for Short Message transfer from SM-TE to SM-SC.

After the SM has been transferred, the connection between SM-TE and SM-SC is released.

In the second step (SM delivery), the SM-SC establishes a call to the SM-TE to deliver the SM to the SM-TE. In this case, the network shall provide the caller ID (the CLI) of the SM-SC to the SM-TE. The SM-TE uses this caller ID information to identify and

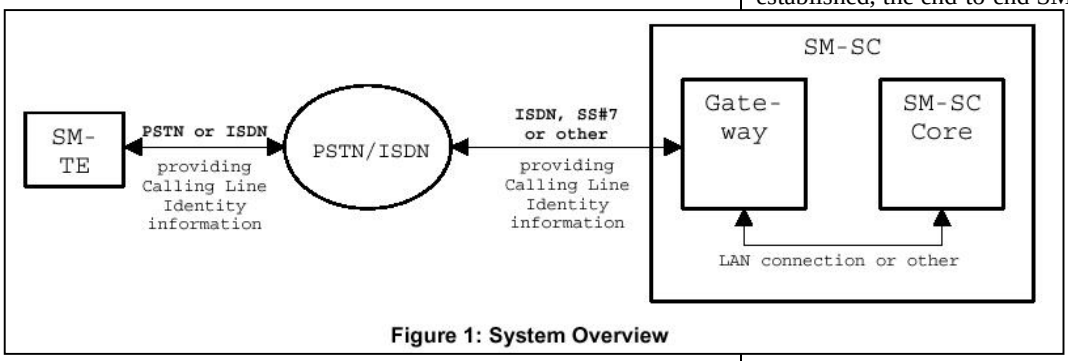

Figure 1: System Overview

[1] CS8014 Test System allows CLIP and SMS Service simulation on PSTN networks.

[2] The internal structure of the SM-SC depicted in figure 1 is just an example for a possible configuration

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connect an incoming call from the SM-SC automatically.
As in the first step, the Short Message is transmitted from the SM-SC to the SM-TE after the voice band connection between SM-SC and SM-TE has been established. After the SM has been transferred, the connection between SM-SC and SM-TE is released.
In case of a PSTN access the CLI is provided either with FSK signalling or with DTMF signalling according to EN 300 659-1…..
…The focus of the present document is to describe the end-to-end interworking and the protocol between the Short Message Terminal Equipment (SM-TE) and the Short Message Service Centre (SM-SC) via the PSTN/ISDN for SM data transfer.
Two different protocols have been developed to enable the Short Message transfer over PSTN/ISDN.

- ✓ The first protocol ('Protocol 1')
- ✓ The second protocol ('Protocol 2')

Protocol 1 - SM Submission from SM-TE to SM-SC

To establish a circuit-switched connection to the SM-SC, the SM-TE seizes the line and dials the number of the SM-SC.
If the SM-TE is connected to a PSTN, it uses the pulse or tone (DTMF) dialling method…….After the call has been answered by the SM-SC, the connection is ready for SM transfer between SM-TE and SM-SC and the SM-SC initiates the data transfer by sending the appropriate Data Link Layer message (DLL_SMS_EST).
For the case that there are more than one Short Message entities connected to the same destination subscriber line (e.g. two or more SM-TEs or a SM-TE containing two or more SMEs which may be assigned to different users), the sending user (GSM or PSTN/ISDN) can address the destined SME/user (PSTN/ISDN) by adding the respective destination SME Subaddress (one digit ranging from "0" to "9") at the end of the destination phone number.
The complete destination address information will then be transmitted within the GSM TL protocol parameter "Destination Address". The sending PSTN/ISDN user's SME Subaddress is transferred to the SM-SC within the SM submission call ……. When delivering a SM, the SM-SC transmits the complete address of the sending user (originating phone number and originating SME Subaddress) within the GSM TL protocol parameter "Originating Address"[3].
It is up to the fixed network SM-SC to define the supported subaddress range and a default subaddress value which is used if no subaddress is specified by the sending user (e.g. "0").…….
Besides this SME subaddressing service, which allows the addressing of different SM-TEs and SMEs/users connected to one subscriber line, the SM-SC may also provide the user the possibility to define password or PIN-protected SMS mailboxes within the SM-SC. The application may access these mailboxes via appropriate hash codes, as usual in GSM.
All information between the entities is transmitted in the voice band using a FSK signalling in compliance with the ETSI specifications EN 300 659-2 and EN 300 778-2 …….

SM Delivery from SM-SC to SM-TE

To deliver a SM to the designated SM-TE, the SM-SC calls the SM-TE's subscriber line. The SM-TE interprets the received calling party number….. to identify the SM-SC and to decide how to handle the call. To enable this interpretation, one or more SM-SC numbers are stored in the memory of the SM-TE.

[3] NOTE: This subaddressing is also possible when exchanging SM with GSM users, including the possibility of immediate reply from GSM to PSTN/ISDN including SME Subaddress.

If the sequence of Basic SM-SC Number and Called SME Subaddress is equal to the respective values stored in the SM-TE, the incoming call is bearing a Short Message for this terminal. In this case, the terminal evaluates the Deliver Mode Identifier to decide whether to accept the call or to call back the SM-SC some seconds later for SM delivery…….
The Deliver Mode Identifier permits the SM-SC two possibilities to initiate a connection between the SM-SC and the SM-TE to deliver a SM to the SM-TE. The difference between these two possibilities is the billing of the costs of the connection.

- The first option is that the SM-TE answers the call from the SM-SC after the caller ID of the SM-SC has been transmitted and evaluated. In this case the costs of the connection are charged for the SM-SC.
- The second option is that the SM-SC terminates the call after a short time. This time shall guarantee that the SM-SC's caller ID has been transmitted to the SM-TE by the PSTN/ISDN. Using this option, the SM-TE does not answer calls from the SM-SC. After the call has been terminated, the SM-TE generates a call back to the SM-SC to receive the SM.
  In this case the costs of the connection are charged for the SM-TE.

The decision which Deliver Mode is used depends on the result of the evaluation of the received caller ID…….

Protocol 2 - SM Submission from SM-TE to SM-SC

To establish a circuit-switched connection to the SM-SC, the SM-TE seizes the line and dials the number of the SM-SC.
If the SM-TE is connected to a PSTN, it uses the pulse or tone (DTMF) dialling method…….
After the call has been answered by the SM-SC, the connection is ready for SM transfer between SM-TE and SM-SC and the SM-SC initiates the data transfer by sending the appropriate Data Link Layer message (DLL_SMS_EST).
All information between the entities is transmitted in the voice band using a FSK signalling in compliance with the ETSI specifications EN 300 659-2 and EN 300 778-2 …….

Protocol 2 - SM Delivery from SM-SC to SM-TE

The selected SM-TE answers the call from the SM-SC after the caller ID of the SM-SC has been received and evaluated.
In case that more than one Short Message entities are connected to the same destination subscriber line (e.g. two or more SM-TEs or a SM-TE containing two or more SMEs), the decision which SME shall answer the call depends on the result of the comparison of the received caller ID with both the stored calling number of the SM-SC in the SM-TE and with the stored SME Subaddress. The received caller ID will be interpreted by the SME …….
The last digit of the received caller ID serves as Called SME Subaddress, the preceding digits serve to identify the SM-SC.
The SME Subaddress range is from 1 to 9; the default value is 1. The 0 value is reserved for future aims.
After the call has been answered by the SM-TE, the data link shall be established in the same way as described in clause 6.2.1 (the only difference is that in this case is the SM-TE that initiates the data transfer by sending the appropriate Data Link Layer message (DLL_SMS_EST)).
Optionally the SM-TE may receive more messages during the same call.