# SMPP Implementation Guide

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# Introduction

The SMS Central SMPP Server can be used by third parties to implement high traffic, two-way, premium and bulk SMS applications. To connect to the SMPP Server, you need to implement an SMPP client that runs on your system.

This guide has been written to help with the implementation of such SMPP client.

If you are already familiar with SMPP, then jump to "Appendix A: Quick Reference" to get started. If you are new to SMPP, then read the full document for more detailed guidance.

# Getting Started

SMPP is particularly suited to high-volume and high-throughput SMS applications. It has the following features:

• Connections established by the client with the server are persistent and may be kept open indefinitely. There is not the connection overhead to be found with protocols such as HTTP that use transient connections.

• Data is encoded tightly into packets so transfers are more efficient than verbose text based encodings such as HTML and XML.

• Requests can be issued by the SMPP client as well as the SMPP server.

• Requests are processed asynchronously, meaning that requests can be issued without having to wait first for responses to earlier requests to be received.

SMPP is typically more complex to implement than other protocols. If the client SMS application does not require the efficiency of SMPP, it may be more appropriate to use the simpler HTTP interface provided by Elisa Estonia.

Elisa Estonia also supports besides CIMD2 and HTTP/HTTPS protocol.

## SOFTWARE LIBRARIES

To add SMPP client functionality to an existing application, the quickest and easiest approach is to use an existing 3rd party library. Commercial and free open source SMPP libraries exist for most of the popular programming languages. These libraries will assist with the tasks of binary encoding/decoding the SMPP data packets and processing of SMPP requests and responses. If there is no requirement to integrate the SMPP client with an existing application, then a standalone SMPP client might be suitable; for example: NowSMS.

## SMPP PROTOCOL

SMPP stands for Short Message Peer to Peer protocol. It is a telecommunications industry standard protocol used for the exchange of SMS messages between SMPP clients and SMPP servers.

Developers should familiarise themselves with the SMPP specifications. Please contact us for a copy of the SMPP Protocol Specification.

**SMPP Requests**

- **bind** request to establish the SMPP session
- **submit_sm** requests issued by the client to send messages to a mobile phone
- **deliver_sm** requests issued by the server to forward messages from the mobile phone to the client, including delivery receipts
- **enquire_link** requests issued by both the server and client to keep the SMPP session alive
- **unbind** request issued by either the server or the client to terminate the SMPP session

## SMPP VERSION

The SMPP version to be used between the SMPP Server and client is specified by the client when first binding to the server. The SMS Central SMPP Server supports both SMPP versions 3.4 (ver. 3.3 is also supported backward compatibility reasons).

# Messaging Types

## TWO WAY SMS

With two-way SMS, messages can be both sent to and received from mobile phones. Messages sent to mobile phones must have a valid source address allowed. Messages sent from mobile phones to this provisioned address will then be forwarded by the carrier. The SMPP Server will then forward these messages to the SMPP client.

There are two types of addresses that may be provisioned with the carrier as explained in the following table. These address types have different provisioning requirements and revenue implications.

| Carrier Address Type Purpose | Purpose |
|---|---|
| SHORTCODE | This type of address is a national address and therefore does not have an international prefix. For example, in Estonia, it will typically have 4 or 5 digits and begin with the prefix "**1**".<br>Shortcodes can be configured for premium charging. This means:<br>• Higher rates can be charged to the mobile phone owner<br>• Different rates can be configured for messages depending on whether they are sent or received<br>• Revenue collected by the carrier is shared - subject to agreements with the carrier and customer<br>Shortcodes need to be provisioned with each participating destination carrier in the country they are used. |
| LONGCODE | This type of address has exactly the same format as a mobile phone number (MSISDN). For example, an Estonian longcode will have the form +3726600620 or +37256123123.<br>A longcode needs to be provisioned with only one carrier but can be used for sending messages to mobile phones with other carriers. |
| Freeoriginator or alphanumeric address | Message sending application can set freely sending address (requires special agreement)<br>Freeoriginator or alphanumeric address could 11 characters long, f.e. "ElisaEesti". |

## Binding to the Server

For an SMPP client to bind (or connect) to the SMPP Server, the destination address and port will be required. These are specified in the "Appendix A: Quick Reference".

The bind request is issued by the SMPP client to the Server. To be authenticated, the SMPP parameters *system_id* and password must be specified. These values are provided by SMS Central.

The bind mode is specified through the choice of the request *command_id* as shown in the following table.

| Bind command_id Session | Functionality |
|---|---|
| ***bind_transmitter*** | For SMPP sessions over which SMS messages will be sent |
| ***bind_receiver*** | For SMPP sessions over which SMS messages will be received. Delivery receipts, which indicate the delivery status of messages that have been sent, are also received on this type of connection. |
| ***bind_transceiver*** | For SMPP sessions which combine both the transmitter and receiver functions. This bind mode can only be specified with SMPP version 3.4 |

The following SMPP bind parameters are ignored by the Elisa Estonia SMPP Server:

*system_type, addr_ton, addr_npi and address_range*.

## Sending an SMS

An SMPP client can send a message to a mobile phone using the SMPP **submit_sm** request. Messages may only be sent over transmitter or transceiver type SMPP sessions.

The Elisa Estonia SMPP Server supports sending of both text and binary SMS (including concatenated SMS).

## ADDRESS PARAMETERS

The SMPP specification defines several parameters, which relate to the source and destination addresses of a message. The following table specifies the values that should be used when issuing **submit_sm** requests to the SMPP Server.

| Field Name | Value |
|---|---|
| ***Source_addr_ton*** | For shortcodes and alphanumeric addresses, the TON value is ignored by the SMPP Server. For longcodes, it is recommended that the address be always expressed in international format, i.e. prefixed with country code. In this case, the TON value is also ignored. |
| ***Source_addr_npi*** | This value is not used by the SMPP Server |
| ***Dest_addr_ton*** | - It is recommended that destination addresses be always expressed in international format, i.e. prefixed with a country code. Where this is the case, the SMPP Server will ignore the TON parameter. |
| ***Dest_addr_npi*** | This value is by default 1 and is ignored by the SMPP Server. |

## DATA ENCODING

The encoding used with message data is specified with the SMPP parameter data_coding, also called DCS (data coding scheme). The SMPP Server will use this value to decode the data so that it can then be encoded with the encoding scheme required by the carrier.

The SMPP Server supports the following DCS values.

| DCS value | Encoding |
|---|---|
| 0 | Default value. With the SMPP Server this is GSM 03.38. |
| 3 | Latin 1 (ISO-8859-1) |
| 4 | Octet (8 bit binary). To be used for binary content. |

## BINARY MESSAGES

The SMPP Server does support the sending of binary messages and concatenated SMS. This capability is subject to destination carriers also supporting these message types.

Binary messages should be encoded with *data_coding* DCS value of 4 (Octet encoding).

Concatenated SMS must be implemented by the encoding of a user data header stored along with the message data. For such messages, *esm_class* must have the User Data Header indicator set, i.e. the bit represented by the hex value 0x40.

## Receiving an SMS

The SMPP Server will forward to the SMPP client messages sent from mobile phones to numbers that have been provisioned by the carrier. To forward these messages the SMPP Server will issue the SMPP request **deliver_sm**. Messages will only be forwarded over SMPP sessions with bind modes receiver or transceiver.

Note that the **deliver_sm** request is also used for forwarding delivery receipts. For more details, refer to section "7".

## ADDRESS PARAMETERS

The following table specifies the SMPP parameter values relating to the message source and destination addresses that will be set by the SMPP Server in **deliver_sm** requests.

| Parameter | Value |
|---|---|
| ***source_addr_ton*** | For messages sent from a mobile phone, the source address (MSISDN) will always be expressed in international format, i.e. prefixed with country code. The TON value will therefore always be set 1. |
| ***source_addr_npi*** | Will always be set to 1 by the SMPP Server. |
| ***dest_addr_ton*** | The TON value for the destination address will be set according to type of number stored in the address.<br>For alphanumeric addresses: 5<br>For shortcode addresses: 2<br>For longcode addresses: 1<br>If the address type cannot be determined, the TON value will be 0. |
| ***dest_addr_npi*** | The NPI for the destination address will be set as follows: For alphanumeric and shortcode addresses: 0 For longcode or unknown address types: 1 |

## ADDRESS PARAMETERS

The following table specifies the SMPP parameter values relating to the message source and destination addresses that will be set by the SMPP Server in **deliver_sm** requests.

## DATA ENCODING

Messages will be forwarded to the SMPP client using Latin 1 (ISO-8859-1), DCS value 3.

# Receiving Delivery Reports

The SMPP Server will forward to the SMPP client delivery reports received from carriers for all messages sent by the SMPP client. Delivery reports will be forwarded using the SMPP **deliver_sm** request. This is the same SMPP request used for forwarding messages sent from the mobile phone. Delivery reports can be distinguished from messages by checking the value of the *esm_class* parameter. If the 3rd bit is on, the request is for a delivery reports.

The choice of which delivery reports are forwarded is determined by the *registered_delivery* field set in the **submit_sm** request used to send a message. Individual bits must be set in this field as specified in the SMPP Specification.

For high traffic applications it is recommended that intermediate notifications be disabled. Reports with stat value of ACCEPTED or ENROUTE are intermediate notifications – refer to the table in the next section 7.1. They do not to indicate the final state of the message and will be followed by a final reports. Intermediate notifications are disabled by setting the 5th bit of the *registered_delivery* field to off.

Note that SMPP may not be the protocol used by the carrier from which the delivery reports is received. The SMPP Server will translate the delivery reports from the protocol used by the carrier into the format used with SMPP.

The SMPP delivery reports format is detailed in the SMPP Specification Appendix B. The delivery reports information is passed in the *short_message* parameter of the **deliver_sm** request.

## STATUS VALUES

For delivery reports forwarded by the SMPP Server, the stat sub-field value of short_message field may have one of the values defined in the following table.

| Field | Type | Description |
|---|---|---|
| **ACCEPTD** | 0x20 | The message has been accepted by the upstream carrier. |
| **DELIVRD** | 0x4 | Message was delivered. |
| **ENROUTE** | 0x20 | The message is en-route, i.e. still being routed to the mobile phone |
| **EXPIRED** | 0x4 | Carrier has given up trying to deliver the message. |
| **REJECTD** | 0x4 | Carrier rejected the message. |
| **FAILED** | 0x4 | The message could not be delivered. The err sub-field should be consulted for further explanation - refer section "7.2 Error Code Values" |

The *esm_class* value of 0x20 indicates that the delivery reports is intermediate - a further reports should follow. The value of 0x4 indicates the delivery reports is final.

# Appendix A: Quick Reference

| Item | Description |
|---|---|
| **SMPP server address** | smsapp.elisa.ee |
| **SMPP server port** | 6699 |
| **SMPP versions supported** | 3.4 |
| **Session bind modes supported** | transmitter, receiver, transceiver |
| **Max concurrent SMPP sessions** | 2 (unless a higher limit is negotiated) |
| **Max concurrent outstanding SMPP requests** | 10 (unless a higher limit is negotiated) |
| **SMPP commands supported** | Bind_receiver; bind_transmitter;<br>unbind<br>submit_sm; data_sm<br>deliver_sm<br>cancel_sm<br>query_sm<br>enquire_link<br>delivery_sm<br>replace_sm<br>change_pwd |
| **character set support** | In submit_sm, data_coding may be set to:<br>0 (SMSC default) = Latin 1 (ISO-8859-1)<br>3 = Latin 1 (ISO-8859-1)<br>4 = Octet (8 bit binary)<br>In deliver_sm, data_coding will be set to:<br>0 (SMSC default) = Latin 1 (ISO-8859-1) |
| **message_id formats** | Numeric hex - in the submit_sm_resp message_id field<br>Numeric hex - in the deliver_sm short_message field |

## Appendix B: Glossary

| Term | Meaning |
|---|---|
| **DA** | Destination Address (of a message) |
| **DCS** | Data Coding Scheme. Defines the encoding scheme used with message data. |
| **DR / DLR** | Delivery Reports (an SMPP request that contains the delivery status of a message that has been sent) |
| **ESME** | External Short Message Entity (i.e. the third party that uses an SMPP client to send and receive messages) |
| **Longcode** | A number provisioned with a carrier that has the same format as an MSISDN. Longcodes are much cheaper to provision than shortcodes, but do not support premium charges. |
| **MO** | Mobile Originated (message) |
| **MSISDN** | Mobile Station International ISDN Number (i.e. a mobile phone number) |
| **MNP** | Mobility Number Portability (database) |
| **MT** | Mobile Terminated (message) |
| **OA** | Originating Address (of a message) |
| **Shortcode** | A national number normally provisioned with each carrier in a country. Shortcodes support premium charges applied to both MOs and MTs. |
| **SMPP** | Short Message Peer to Peer (protocol) |
| **SMS** | Short Message Service (message) |
| **SMSC** | Short Message Service Centre (i.e. the SMPP server) |
| **TON** | Type Of Number. For specifying the type of address of an OA or DA, e.g. national or international |
| **TLV** | Tag Length Value (ie an optional SMPP parameter) |