

## SMPP

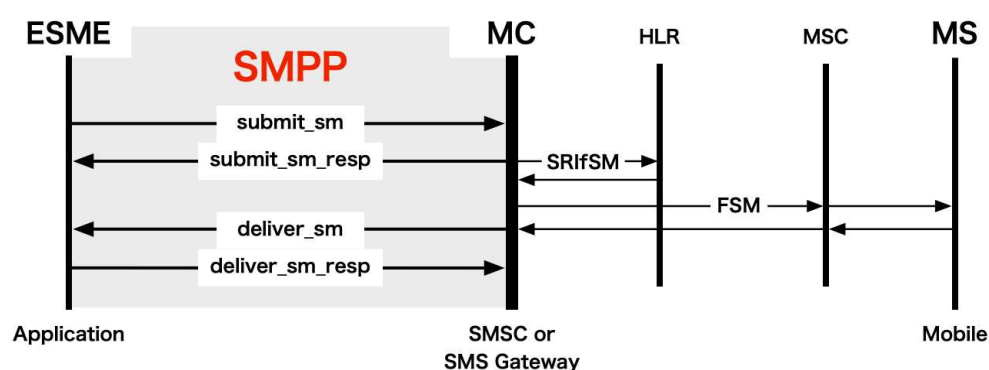


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# SMPP

SMPP Protocol: Enabling SMS messaging between applications and mobiles.

[SMPP Client >](#)[SMPP SMS platform >](#)[SMPP Load Balancer >](#)[SMSC Simulator >](#)

Mobile Terminated (MT) SMS with delivery receipt using SMPP

The SMPP (Short Message Peer-to-Peer) protocol is an open, industry standard protocol designed to provide a flexible data communications interface for the transfer of short message data between External Short Message Entities (ESME), Routing Entities (RE) and Message Centres (MC). It is a means by which applications can send and receive SMS messages to and from mobile devices. Applications do this using an SMPP connection to a Short Message Service Center (SMSC), SMS gateway, SMPP gateway or hub.

## SMPP API Overviews

- [SMPP Protocol Overview](#)
- [Overview of SMPP v5](#)
- [SMPP Delivery Receipts](#)

- [SMPP Delivery Receipt Error Codes](#)
- [SMPP PICS \(Protocol Implementation Conformance Statement\)](#)

## Developers

- [SMPP Testing & Development](#)
- [Testing](#) - SMSC simulator, tools (load test, analyser, SMPP client), gateways, packet capture
- [Development](#) - libraries for C++, C#, Go, Java, Node.js, Perl, PHP, Python, Ruby, Rust; tutorials; SMS code bench

## Short Message Service (SMS)

- [3GPP Technical realization of the Short Message Service \(SMS\)](#)
- [Concatenated SMS \(long SMS\)](#)

## SMPP Specifications

There are three versions of the SMPP protocol specification in use. The original public version of the specification is SMPP v3.3 and was released in 1997. This was updated in 1999 to [SMPP v3.4](#). The final version was released in 2003 and is SMPP v5.

### SMPP v3.3

SMPP 3.3: [Short Message Peer to Peer Protocol Specification v3.3](#)

### SMPP v3.4

SMPP 3.4: [Short Message Peer to Peer Protocol Specification v3.4, 12-Oct-1999, Issue 1.2](#)

### SMPP v5

SMPP 5: [Short Message Peer to Peer Protocol Specification v5](#)

## Ancillary documents

- [SMPP PICS - SMPP v3.4 Protocol Implementation Conformance Statement \(PICS\) Proforma, 12-Jul-2001](#)
- [SMPP v3.4 Protocol Implementation guide for GSM / UMTS, 30-May-2002, Version 1.0](#)

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## SMPP Protocol Overview

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## What is SMPP?

The SMPP (Short Message Peer-to-Peer) protocol is an open, industry standard protocol designed to provide a flexible data communications interface for the transfer of short message data between External Short Message Entities (ESME), Routing Entities (RE) and Message Centres (MC). It is a means by which applications (termed ESMEs) can send SMS messages to mobile devices and receive SMS from mobile devices.

It can also be used as an API for use with USSD, CBC and other mobile services.

## Supported Cellular Technologies

SMPP is designed to support short messaging functionality for any cellular technology and has specific applications and features for technologies such as: GSM, UMTS, LTE, IS-95 (CDMA), CDMA2000 (1xRTT & 3xRTT), ANSI-136 (TDMA), iDEN

## Typical Applications of SMPP

The variety of messaging applications, particularly using SMS, for which SMPP can be employed is almost boundless. Mobile Operators, Message Centre vendors, Infrastructure Providers, and application developers are continually developing new applications for SMS. SMPP is ideal as an

access protocol for these applications. The following summarises typical applications of SMPP:

<b>Marketing.</b> Businesses send promotions to customers as text messages.
<b>Booking confirmations.</b> Hotels, restaurants, taxis. Confirmations via SMS are better than email when it comes to immediate notification.
<b>Appointment reminders.</b> Used by businesses to remind customers of appointments and avoid the financial impact and/or impact on customer of a missed appointment.
<b>Two-factor authentication / OTP.</b> Using SMS to send a code that is used as a second factor to verify the identity of an individual. Used for logins.
<b>Voicemail alerts</b> originating from a VPS (Voice Processing System), indicating voice messages at a customer's mailbox. This is arguably one of the first ESME-based applications of SMS and is still heavily used in the industry.
<b>Numeric and alphanumeric paging services.</b> With an SMS-capable phone, the need to carry both pager and phone is drastically reduced.
<b>Information services.</b> For example, an application that enables mobile subscribers to query currency rates or share-price information from a database or the WWW and have it displayed as a short message on the handsets.
<b>Voice-to-text.</b> Calls directly dialled or diverted to a message-bureau operator, who forwards the message to the MC, for onward delivery to a subscriber's handset.
<b>Directory services.</b> For example a subscriber calls a directory service requesting information on restaurants in a given area. The operator lists out available restaurants and sends the appropriate information as an SMS to the caller.
<b>Location-based services.</b> These include applications that use mobile hardware to send GPS or cell data across SMS and using

an MC, relay these messages to an ESME. The ESME may then use the collected data to manage services such as taxi assignment, stolen vehicle tracking and logistics control.

**Telemetry applications.** For example, a household meter that transmits a short message to a utility company's billing system to automatically record customer usage.

**Security applications.** Such as alarm systems that can use SMS services for remote access and alerting purposes. For example, a parent receives an SMS from his security company to inform him that his daughter has arrived home and keyed in her access code.

**WAP Proxy Server.** A WAP Proxy Server acts as the WAP gateway for wireless Internet applications. A WAP Proxy Server may select an SMS or USSD bearer for sending WDP datagrams to and receiving WDP datagrams from a mobile station.

**Online Banking, Share Dealing and E-Commerce.** A mobile user could use SMS to send messages to an ESME requesting the purchase of products, shares etc. Likewise, a subscriber may use SMS to access banking services such as bill payment and funds transfer.

**Gaming and SMS Chat.** Mobile users can interact with each other by means of a central server (ESME) and use this interaction as a means of playing wireless games, dating or SMS chat services similar to the concept of instant messaging and Internet room. These services have already appeared in the form of SMS-TV and SMS-Radio services.

**MMS Notification.** In Multimedia Messaging, SMS is a bearer for the Multimedia Message Notification, which informs the recipient MMS user agent that a multimedia message is available on the Multimedia Message Centre.

**Cell Broadcast Services.** Applications designed to support geographical messaging such as traffic alerts and emergency services may use the Cell Broadcast features of SMPP to upload

messages for periodic broadcast to subscribers within a given location.

## SMPP Sessions

In order to make use of the SMPP Protocol, an SMPP session must be established between the ESME and Message Centre or SMPP Routing Entity where appropriate. The established session is based on an application layer TCP/IP connection between the ESME and MC/RE and is usually initiated by the ESME. The connection is often over the Internet and can use SMPP over TLS or a VPN to secure the connection. SMPP has been assigned TCP port 2775 by [IANA](https://www.iana.org/), however other port numbers are often used.

There are three forms of ESME-initiated session:

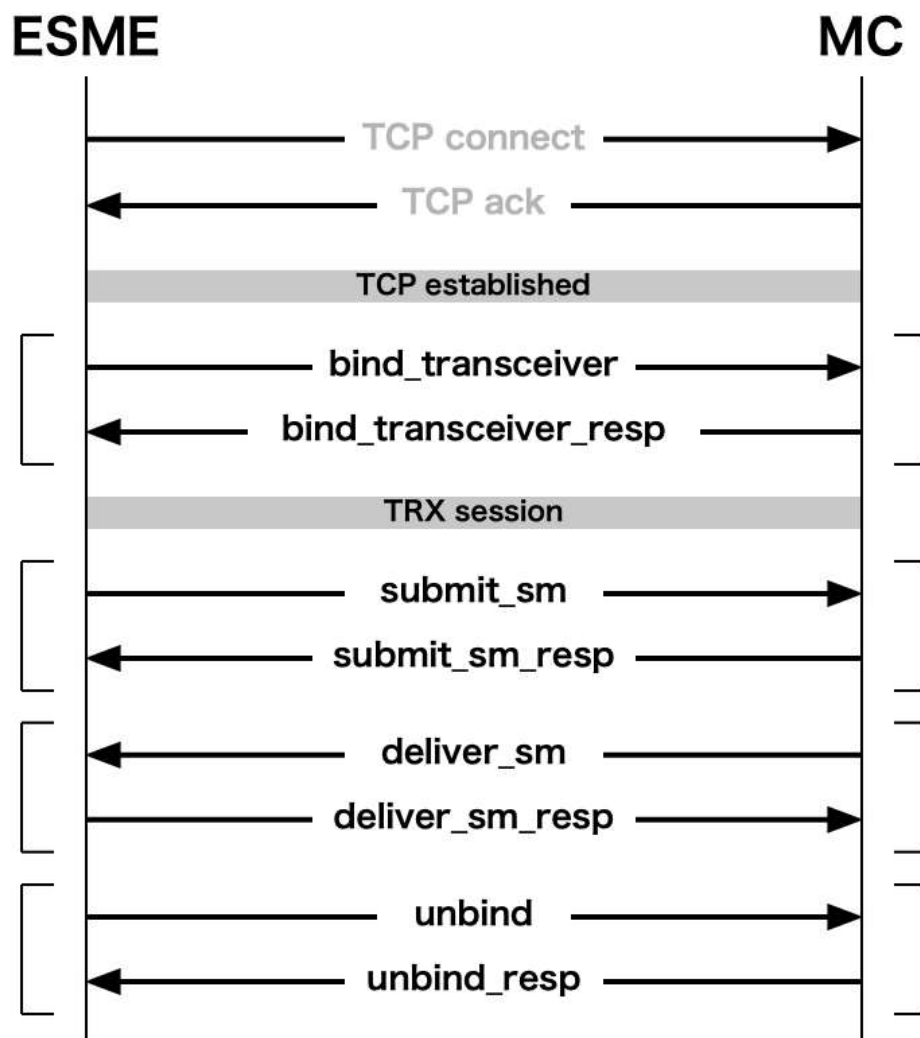
- **Transmitter (TX)** - when authenticated as a transmitter, an ESME may submit short messages to the MC for onward delivery to Mobile Stations (MS). A transmitter session will also allow an ESME cancel, query or replace previously submitted messages. Messages sent in this manner are often called mobile terminated messages.
- **Receiver (RX)** - a receiver session enables an ESME to receive messages from an MC. These messages typically originate from mobile stations and are referred to as mobile originated messages.
- **Transceiver (TRX)** - a TRX session is a combination of TX and RX, such that a single SMPP session can be used to submit mobile terminated messages and receive mobile originated messages. SMPP v3.3 does not support TRX sessions. Support is available in [SMPP v3.4](https://www.iana.org/) and v5.

Additionally, the Message Centre can establish an SMPP session by connecting to the ESME. This is referred to as an Outbind Session.

## Protocol Operations and PDUs

The SMPP protocol is a set of operations, each one taking the form of a request and response Protocol Data Unit (PDU) containing an SMPP command. For example, if an ESME wishes to submit a short message, it may send a `submit_sm` PDU to the MC. The MC responds with a `submit_sm_resp` PDU, indicating the success or failure of the request. Likewise, if an MC wishes to deliver a message to an ESME, it may send a

`deliver_sm` PDU to an ESME, which in turn responds with a `deliver_sm_resp` PDU as a means of acknowledging the delivery.



Example SMPP session

Some operations are specific to an ESME with others specific to the MC. Others may be specific to a given session type. Referring to the `submit_sm` and `deliver_sm` examples above, an ESME may send a `submit_sm` to an MC only if it has established a TX or TRX session with that Message Centre. Likewise, an MC may send `deliver_sm` PDUs only to ESMEs that have established RX or TRX sessions.

Operations are broadly categorised into the following groups:

- **Session Management** - These operations are designed to enable the establishment of SMPP sessions between an ESME and MC and provide means of handling unexpected errors.

- **Message Submission** - These operations are explicitly designed for the submission of messages from ESME(s) to the MC.
- **Message Delivery** - These operations enable an MC to deliver messages to the ESME.
- **Message Broadcast** - These operations are designed to provide Cell Broadcast service within a Message Centre.
- **Ancillary Operations** - These operations are designed to provide enhanced features such as cancellation, query or replacement of messages.

## SMPP PDU Example: Send SMS (submit\_sm / submit\_sm\_resp)

The following is an example `submit_sm` and `submit_sm_resp`.

### submit\_sm

Bytes	Field	Meaning
<b>PDU header</b>		
00000048	Length	72 bytes
00000004	Command ID	SUBMIT_SM
00000000	Command Status	n/a
00000002	Sequence Number	2
<b>PDU body</b>		
00	Service Type	null (none specified)
05	Source Address TON	Alphanumeric
00	Source Address	None / Unknown



Bytes	Field	Meaning
	NPI	
4d656c726f73654c61627300	Source Address	MelroseLabs
01	Destination Address TON	International
01	Destination Address NPI	ISDN
34343737313233343536373800	Destination Address	447712345678
00	ESM Class	0
00	Protocol ID	0
00	Priority Flag	0
00	Schedule Delivery Time	Deliver immediately
00	Validity Period	SMSC default validity
01	Registered Delivery	SMSC delivery receipt requested
00	Replace If Present Flag	0
00	Data Coding	Default character set
00	Short Message	0

Bytes	Field	Meaning												
	Default Msg ID													
10	Short Message Length	16 bytes												
48656c6c6f20576f726c64201b650201	Short Message	<div>Hello World €\$£</div> <div>Message is using Data of 0 (i.e. the MC's default character set) which is configured on the N the GSM character set encoding has following meaning:</div> <table><tr><th>Hello World</th><th>SP</th><th>€</th></tr><tr><td>48656c6c6f</td><td>20</td><td>1b</td></tr><tr><td>20</td><td></td><td>65</td></tr><tr><td>576f726c64</td><td></td><td></td></tr></table>	Hello World	SP	€	48656c6c6f	20	1b	20		65	576f726c64		
Hello World	SP	€												
48656c6c6f	20	1b												
20		65												
576f726c64														

submit\_sm\_resp

Bytes	Field	Meaning
PDU header		
00000051	Length	81 bytes
80000004	Command ID	SUBMIT_SM_RESP
00000000	Command Status	n/a

Bytes	Field	Meaning
00000002	Sequence Number	2
PDU body		
30393537326130613039626337336632	Message	09572a0a09bc73f2e90e9
65393065393338626336656138636132	ID	dcf0cd45b40981e4629f8
64636630636434356234303938316534		
36323966383430353535343765613331		
00		

## SMPP Commands

The following is a list of all SMPP commands:

Command ID	Value	Purpose
bind_receiver	0x00000001	Establish a receiver bind.
bind_receiver_resp	0x80000001	
bind_transmitter	0x00000002	Establish a transmitter bind.
bind_transmitter_resp	0x80000002	
query_sm	0x00000003	Query status of previously submitted message.
query_sm_resp	0x80000003	

Command ID	Value	Purpose
submit_sm	0x00000004	Submit message to the Message Center for onward delivery to mobile / short message entity (SME).
submit_sm_resp	0x80000004	
deliver_sm	0x00000005	Send message to ESME from MC (typically delivery receipt or mobile originated SMS).
deliver_sm_resp	0x80000005	
unbind	0x00000006	Unbind from MC and close SMPP session.
unbind_resp	0x80000006	
replace_sm	0x00000007	Replace a previously submitted message that is pending delivery.
replace_sm_resp	0x80000007	
cancel_sm	0x00000008	Cancel delivery of previously submitted message(s).
cancel_sm_resp	0x80000008	
bind_transceiver	0x00000009	Establish a transceiver bind.
bind_transceiver_resp	0x80000009	

Command ID	Value	Purpose
outbind	0x0000000B	Request ESME to bind (sent by MC).
outbind_resp	0x8000000B	
enquire_link	0x00000015	Initiate a check to confirm ESME/MC is still reachable.
enquire_link_resp	0x80000015	
submit_multi	0x00000021	Submit message to the Message Center for onward delivery to multiple mobiles / short message entities (SME).
submit_multi_resp	0x80000021	
alert_notification	0x00000102	Indicate to ESME that mobile subscriber has become available.
data_sm	0x00000103	Submit packet to MC for onward delivery to SME or from MC to ESME.
data_sm_resp	0x80000103	
broadcast_sm	0x00000111	Submit message to the Message Center for onward delivery to mobiles in a specified geographical area or set of areas.
broadcast_sm_resp	0x80000111	

Command ID	Value	Purpose
query_broadcast_sm	0x00000112	Query status of previously submitted broadcast message.
query_broadcast_sm_resp	0x80000112	
cancel_broadcast_sm	0x00000113	Cancel delivery of previously submitted broadcast message.
cancel_broadcast_sm_resp	0x80000113	
generic_nack	0x80000000	Acknowledge unrecognized or corrupt PDU.
<i>Reserved</i>	0x00010200- 0x000102FF 0x80010200- 0x800102FF	Reserved for MC vendors to define

This domain was acquired in June 2019 for the purpose of being a source of reference for the Short Message Peer-to-Peer (SMPP) protocol. The objective is to return this domain back to being the main reference for SMPP. The site includes the SMPP specifications, tools and other related resources.

This domain was originally the home of the SMPP Developers Forum / SMPP Forum that later became the now disbanded SMS Forum. This site has no association with any legal owner of the protocol or successor organisation.

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