— OpenSMS —

The SMS gateway of OpenIT GmbH

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1 Introduction

Every month about 200 Billions of SMS are being sent worldwide, and about 8 Billions in Germany alone.[1]

About 10% of the SMS are so-called Service SMS or event-triggered SMS. This includes ring-tones, operator logos, PIM-Entries[2] and of course computer-generated text messages.

OpenSMS presents the technical back-end solution for your applications, portal sites or events.

2 Positioning

SMS are being sent and received from the cell phones via the SMSCs[3] of the GSM carriers.

How do SMS, which are triggered by Software or a Web interface, reach their destination? This is the purpose of the **OpenSMS** Gateway Software.

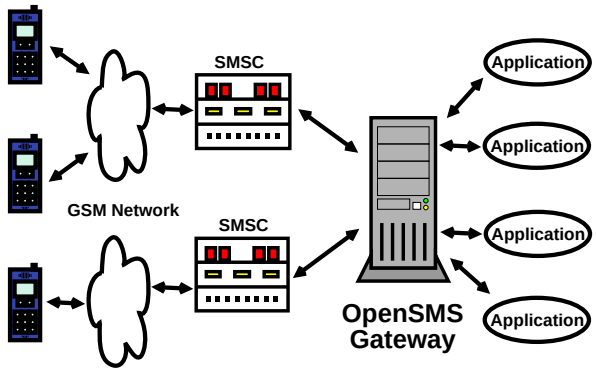

Figure 1: SMS infrastructure

OpenSMS handles the communication between the application and the SMSC: SMS generated by applications are sent to the cell phones by **OpenSMS** via the SMSCs and Cell phone generated SMS are collected by the SMSCs and forwarded to the application by **OpenSMS** .

OpenSMS is a SMS management system suitable for the sending and receiving of some thousand SMS up to many millions of SMS per month. Its multi-user and accounting facilities provide a powerful reseller platform.

[1] Source: Heise Verlag
[2] Personal Information Manager
[3] Short Message Service Center

3 Overview of key features

- easy to use interfaces for applications
- handling of incoming (SMS MO) and outgoing SMS (SMS MT)
- support of premium SMS protocols
- multi-user support
- high throughput: 10 million messages per month per server
- scalability: multiplying throughput by using of multiple servers
- build-in support of many message types
- SMSC protocols UCP, SMPP, OIS (SMS 2000) and CIMD
- line protocols TCP/IP, X.25, X.31 and frame relay
- high system stability
- user administration per web interfaces
- extensibility
- use of standard Internet technology and protocols
- monitoring abilities
- source code delivered with application

4 SMS data types und Smart Messaging

4.1 Text SMS

All incoming text SMS are automatically translated from ISO-Latin-1 coding into the best 7-Bit GSM alphabet representation. This is needed by most applications.

Alternatively, 7-Bit codings can directly be inserted using Unicode representation.

4.2 Smart Messaging

“Smart Messaging” is an open standard proposed by NOKIA Mobile Phones. It defines the coding and delivery of binary SMS, like ringtones, operator logos or WAP configurations.

OpenSMS allows a fast and simple application development for sending all types of SMS by taking care of all necessary convertions, and preparing the User Data Header.[4]

4.3 WAP Push SMS

WAP Push SMS are used to send links to mobile devices. They are typically utilized to start the delivery process of content items like ring tones or Java applications (Midlets).

5 Architecture

OpenSMS is a modular environment. Its components can run on a single server as well as on many distributed servers.

If only one server is used, the maximum throughput of the system is about 10 millions SMS per month.

When needed, the capacity can be extended by simply adding web servers, database servers or “smsd” servers.

5.1 Interface to applications

The **OpenSMS** gateway provides two interfaces for the exchange of SMS with the application, one via HTTP request and the other via E-Mail.

[4] The User Data Header is being transmitted to the cell phone and defines how the content of the SMS should be handled.

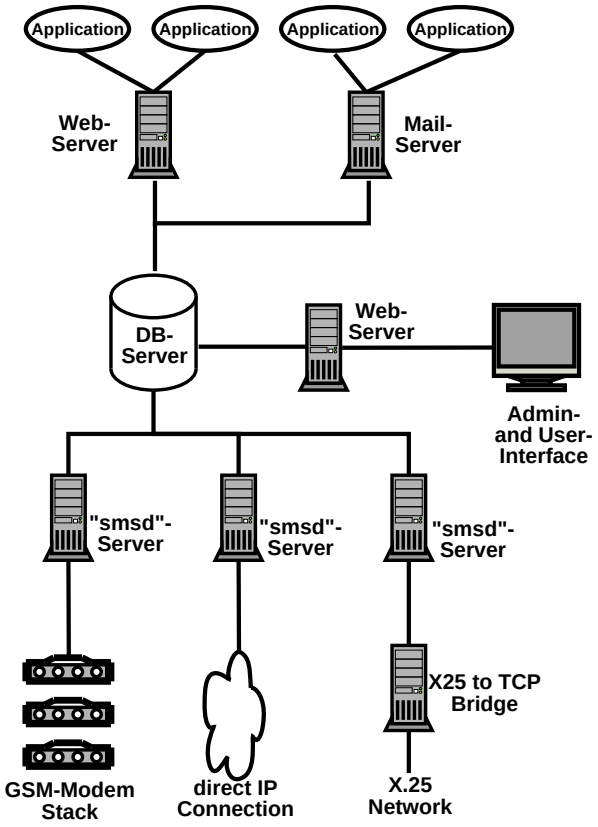

Figure 2: Architecture

5.1.1 HTTP Interface

SMS can be sent by a HTTP request (GET or POST).

Example: HTTP request

Sending of an SMS originating from the number “123” to the GSM-Destination 0049171999999 and the content “hello world” via HTTP/GET

```
http://sms.openit.de/cgi-bin/sms-put?
        orig=123&dest=0049171999999&data=hello+world
```

Such a request can be accomplished by a few lines of code in a Web application. Coding examples are included in the documentation part of the **OpenSMS** Gateway Software.

When an incoming SMS is received from the network, the **OpenSMS** gateway triggers a HTTP request which delivers the SMS to the application.

Incoming and outgoing HTTP requests can be protected by HTTP “Basic Authentication” and can be secured by SSL encryption.

5.1.2 E-Mail Interface

The sending of an SMS can also be triggered by an incoming E-Mail, which uses the same parameters and offers the same functionality.

Example: Sending via E-Mail

Sending of an SMS originating from “123” to the destination number 0049171999999 and the content “hello world” via the E-Mail Interface:

```
From: application
To: mail2sms@sms.OpenIT.de

orig = 123
dest = 0049171999999
data = hello world
```

An SMS received from the network can also be converted into an E-Mail and be forwarded to the application to be processed.

5.2 The databases

Several databases are used to manage and archive the SMS, they are also used for accounting and billing.

Outgoing SMS database table: All SMS generated by the HTTP and E-Mail interfaces are stored in this database table. It keeps information about the time of the request, the actual time of sending, the carrier to be used and the state of the SMS (eg. “new”, “processed” or “error”).

The sending “smsd” process fetches the SMS from this table and updates the state of the SMS to “processed” when the SMS has been sent successfully. If an error occurs during the sending, (eg. an invalid destination address) the state of the SMS is set to “error”. A clear-text error message is generated and inserted into the outgoing SMS table.

Users can log into the Web interface and check the state of their SMS, search for a single SMS or view statistical information. An extended Web interface is available for administrators.

Incoming SMS database table: All SMS received from the GSM network are inserted into the Incoming SMS table with their affiliated data.

Archive Tables: At regular intervals, e.g. once per night, all processed SMS are moved into an archive table. Hence the main tables stay small and the database performance is sustained.

Users and administrators can still access all SMS and their related data in the archive tables.

Blacklist Tables: Blacklist tables may limit the number of SMS that can be sent to one GSM phone number. This prevents misuse of the system. It is also possible to completely block individual destination numbers or set higher or lower limits.

5.3 Sending processes “smsd”

The sending software consists of so-called Unix system daemons. They make up the interface of the **OpenSMS** gateway to the SMSCs of the GSM network or other output channels, for example GSM modems.

Every sending daemon process takes care of sending SMS over one specific output channel. Therefore a fault condition of one SMSC does not interfere with the sending of SMS to other carriers.

A configuration file enables the administrator to determine which SMS are to be processed by this daemon process, to specify if any SMS should be received, what protocol the SMSC uses and by which protocol the SMSC can be reached via the physical link.

5.3.1 SMSC connections:

The physical links to the SMSCs typically have a bandwidth about one to several hundred SMS per second.

The reception of SMS under a central short number is possible, if the carrier supports this feature.

The following protocols are provided to communicate with SMSCs:

- ERMES UCP (Universal Computer Protocol) incl. Large Account related extensions
- SMPP (Short Message Peer to Peer Protocol)
- OIS - SMS2000 Open Interface Specification

The following protocols are provided to address SMSCs over physical links:

- TCP/IP over Internet, Leased Lines, DialIn
- X.25

- X.31
- TCP/IP over X.25
- Frame Relay

All reasonable combinations of the above are possible.

5.3.2 GSM Modems

GSM modems offer another possibility to send or receive SMS. Although they have some disadvantages (e.g. bandwidth limitations), they often provide a useful addition because of their special functionality.

GSM modems have a bandwidth of about 6 SMS per minute and they provide a low-cost possibility to connect to carriers when smaller amounts of SMS are expected. By installing several GSM modems in parallel, the possible throughput can be increased.

The ability to receive SMS under a network wide, universally reachable telephone number is a particular advantage of GSM modems. This number can be reserved for a customer and/or an application to collect all the affiliated SMS. The receiving capacity is about 50 SMS per minute and per GSM modem.

Supported GSM modems:

- Falcom GSM Modems
- all Nokia cell phones with hardware modem and serial interface (6210, 7110, ...)

6 Project support

OpenIT is able to provide support for all your SMS projects. The complete **OpenSMS** system can be installed at your site on request, and your administrators and programmers can be trained by us.

After the successful installation we continue to support the **OpenSMS** gateway, if necessary on a 24/7 basis.

7 Delivery of OpenSMS includes:

- HTTP Interface

- E-Mail Interface
- example code for user applications
- Sending daemons “smsd”
- Web interfaces for users and administrators
- Scripts for automatic management of the system
- a TCP to X.25 bridging software
- Documentation

8 Overview of OpenSMS characteristics

- simple interface to applications
- Processing of incoming and outgoing SMS
- Multi-user capabilities
- highest throughput rates
- scalability: throughput rates can be multiplied by use of parallel servers
- integrated support for all SMS data types
- SMSC protocols UCP, SMPP and OIS (SMS 2000)
- line protocols TCP/IP, X.25, X.31 and Frame Relay
- Sending and receiving with GSM modems
- High availability
- Convenient Web interface
- Expandability
- Use of standard Internet protocols
- self-monitoring of functionality
- application is delivered with source code

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