SMS and USSD Messaging Center

System Description

PROTEI SMSC is a well proven SMS and USSD messaging platform that receives, processes, stores, and sends all kinds of Short Messages (SMS) within a mobile network or between mobile network and external applications (ESME). PROTEI SMSC also supports USSD service on the same software and hardware platform that increase messaging services spectrum available for PROTEI SMSC customers.

The PROTEI SMSC is a cost-effective, high performance and scalable solution, with a wide range of features to suit both new and existing mobile operators and content providers. It also offers substantial cost savings to the operators who have already deployed large scale of SMSCs and are looking for a lower cost/easy-to-use solution to maximise traffic revenues and profits.

The PROTEI SMSC scalable architecture and flexible throughput licensing enables the operator to select a solution that not only mirrors the today's revenue stream, but can be used to meet operator tomorrow's needs.

Range of the supported protocols allows deploying PROTEI SMSC in GSM or IS-41 (D-AMPS, CDMA) networks. Support of SIGTRAN allows easy integration into the next generation mobile networks. Reach system functionality allows efficiently adopting SMSC to the Operator's needs. Flexible delivery scenario management allows defining message delivery scenarios based on the Alert messages, or time schemes based on previous delivery attempt error code. Embedded "First Delivery Attempt" feature dramatically increases system throughput and reliability on the same hardware comparing with traditional architecture solutions. PROTEI SMSC can efficiently work with queues having length up to 1 mln of messages. Policy management subsystem allows defining groups of number with different access rights (e.g. numbers that haven't access to SMS VAS). Convenient licensing principles (no licensing by peak load) allow the Operator efficiently working during traffic peaks (like at New Year Holidays etc).

Additional SMS/USSD Applications

Protei SMS/USSD messaging platform solutions family includes a wide range of the applications broading a spectrum of services that are available on the base of this platform.

Customer Care Software Package
Customer care software package is available for PROTEI SMSC. This ESME implements the main customer care functions with SMS/USSD access: information about balance and prepaid card activation. Integration with mobile operator's billing system is provided during the software installation.

Fixed Line SMSC
PROTEI Fixed Line SMSC enables SMS exchange between fixed phones and between mobile and PSTN phones. Advanced functionality and flexible configuration provide fast system deployment and easy integration with operator's environment.

Standalone USSD Server
PROTEI USSD server provides USSD messages exchange between the mobile subscribers and the external applications in GSM networks. Using PROTEI USSD server operator can provide for its subscribers such services as balance enquiry; voucher activation and other customer care services by the most efficient and convenient way. PROTEI USSD-server supports flexible USSD message routing on the base of the service key, message body and source MSC address with possibility of the access policy and bandwidth management for each application individually. USSD stage I and stage II are supported and this allows creating dialogue USSD services with multilevel USSD-menu.
Embedded tools for convenient and flexible USSD-menu construction are supported. Open XML and/or ODBC interface for integration with external information systems and databases aresupported.

SMPP-Proxy Router
SMPP proxy/router is intended for the mobile operators and the content aggregators. The system enables messages exchange between one or more SMS/USSD centers and external applications by several routing criteria. Flexible policy and bandwidth management allow creating branched routing algorithms (based on message's type, recipient and sender numbers, application IP address etc.) that allows deployment of the SMPP proxy/router as a key element of content provider's access system.

SMS-to-ICQ Gateway
SMS-to-ICQ service provides an opportunity of exchanging messages between mobile network subscribers and ICQ Internet-service users via SMS. The service supports basic ICQ functionality (status management, sending and receiving messages, contact searching, contact list management). Interaction with SMSC is performed via SMPP protocol. Interaction with ICQ servers is performed via XML protocol.

Global SMS Server
Global SMS server gives a unique opportunity to provide a variety of SMS VAS for the subscribers of all operators that has SMS exchange possibility with Global SMS server owner like for the Operator's roaming partners.
Using Global SMS solution Operator receives possibility to make all its SMS VAS available for inbound roaming visitors of its network that increases revenues both directly (revenue generation from SMS VAS usage) and indirectly (making the network more attractive for the roamers).

E-mail SMS Gateway
E-mail SMS gateway provides an opportunity of exchanging messages between the mobile network subscribers and e-mail service users via SMS. The service supports such functionality as sending and receiving messages, account management and alias management. Simple command interface for account management increases serviceusability. Interaction with SMSC is performed via SMPP protocol. Interaction with external e-mail servers is performed via SMTP protocol.

SMS Sender
PROTEI SMS sender is a powerful and convenient tool for mass SMS sending. System provides possibility to make mass SMS sending actions using predefined mailing lists and texts. Mailing lists can be created automatically by using information from the external databases (like Operator's billing) or manually by System Administrator. Individual parameters can be defined for each mailing like the mailing schedule, data source etc. Convenient multilanguage graphic user interface provides easy system deployment in nontechnical departments of the Operator (marketing etc.)

System Features

- Field-proven technology;

- Send/Receive text and binary MO/MT;

- SMS/EMS messages and MO/MT USSD messages between the and the application (ESME);

- Flexible postponed delivery scenarios;

- Alert_SC procedure support;

- EMS, Nokia Smart Messages and Siemens OTA messages compatibility;

- Fully functional SMPP v3.4 to ESMEs;

- Replace_SM and Cancel_SM procedures support;

- USSD stage 1 and stage 2 support;

- USSD service key analysis for message routing to ESME;)

- SS7 flexible parameter setting;

- Individual access rights configuration for each ESME;

- Several IP connections to the same ESME;

- Hundreds simultaneously connected content providers;

- White and black lists for the subscribers and ESMEs;

- Delivery notification to the message originator;

- Email-to-SMS and SMS-to-email (SMTP);

- Up to 32 links per one SMS/USSD gateway;

- ETSI GSM 03.40 and 03.38 compatible;

- GSM MAP phase I, II, III and IS41 support;

- Built-in location based service enabler (providing Cell ID information about subscriber by ESME request);

- Scalable according to the network growth;

- SNMP management alarms and E-mail/SMPP alarm notification;

- Supports bulk over-the-air activation and provisioning of the mobiles (SIM updates);

- Horizontal scaling;

- Performance from tens to hundreds messages per second per one unit;

- Available queue size – hundred thousand of messages;

- Powerful logging system (CDR generation);

- Dynamic configuration of the system parameters.

PROTEI SMSC Architecture
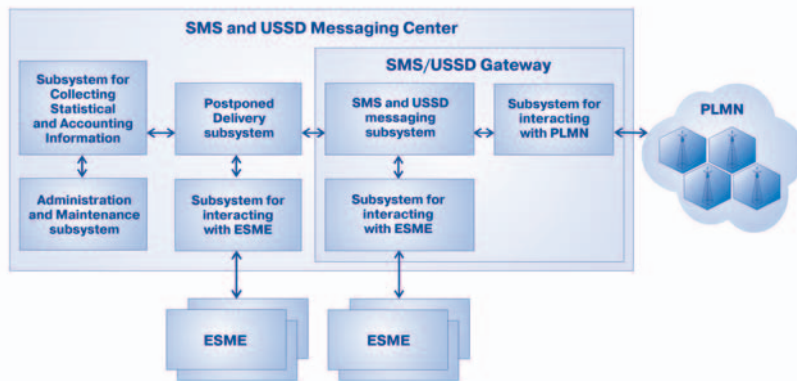
System architecture

The PROTEI SMSC consists of several subsystems, each responsible for its own specific task.

PROTEI SMS/USSD gateway is the part of the PROTEI SMSC, where it is responsible for SS7 stack support, interaction with other PLMN components and MAP to SMPP conversion, thus the gateway can be used as an independent device for providing an offload SMS delivery service to protect the SMSC from unnecessary traffic. Often SMS messages addressed to PLMN subscribers who are already active in the network has no need to pass through the SMSC, since the message will be delivered immediately. Therefore SMS messages could be passed to the PROTEI SMS/USSD gateway that will attempt one delivery of the SMS to the specified subscriber, and if it is unsuccessful then it will send the message via SMPP to the executing Mobile Operators SMSC. In the PROTEI SMS/USSD gateway configuration system Administrator can determine if the text message is passed to the SMSC on the delivery failure, or just error code should be returned to ESME. This functionality decreases the overhead single delivery attempt that is often desirable for SMS messages that contain information relevant for a short time, such as stock quotes.

The Postponed Delivery Subsystem is intended for postponed delivery functions implementing including storage of the delayed messages and message queuing.

Subsystem for Statistical and Accounting Information Collection is intended for collecting statistical and accounting information (CDR, message counters, error counters) concerning with the system functioning (SMS registration logs, SMS delivery attempts logs etc.).

The Administration and Maintenance Subsystem is intended for administering and configuring the system and also for monitoring of the system functioning (to receive event and alarm information from the system.).

ESME Traffic Management

To guarantee high productivity of the system when interacting with external applications, the traffic from external applications to GSM network can be limited. Limitations can be applied to the rate of the transfer or to the number of the messages being sent during the specified time interval. According to the limiting thresholds, set by the system Administrator, the system will either accept or reject new message from ESME. Also, this feature can protect the message queue from overflow, even if there is no outgoing traffic.

System Scalability and Reliability

PROTEI SMSC can be scaled horizontally. When the productivity of one of the subsystems (e.g. SMS/USSD gateway or Postponed Delivery Subsystem) reaches its maximum, additional modules are used. The system has a network architecture, which additionally increases its reliability. Reserving of the center is carried out according to the scheme when the modules with the excessive total load are used in the load-sharing mode. If one of the modules fails, the traffic is redistributed among other modules without any service interruption. Modules can be replaced also without any interruption in servicing. Thus, PROTEI-SC system lacks any failure points or bottlenecks that can limit its maximum performance.

System Hardware and Software

- Intel platform HP;

- Compact 19" rack mounting equipment – 2U high;

- Dual processor/PSU optionally available;

- High reliability with Raid 1 or Raid 5 SCSI HDD;

- Linux/XFS.