Missed Call Notification System ('Who Called')

General Information

PROTEI Missed Call Notification System uses SMS technology to provide mobile subscribers with information about calls they missed (when they were out of network coverage, their telephone was switched off or they were otherwise unavailable) by sending short messages (SMS) with a list of telephone numbers from which the missed calls were made. It also can notify the calling party when the called party becomes available for incoming calls again (the 'Notify Me' subservice).

In many countries, callers don't tend to leave messages in voice mailboxes, but nevertheless want to know who called them when they were unavailable for incoming calls.

Callers who are unable to get through want to know when the person they were calling is available again.

PROTEI Missed Call Notification System meets both these requirements. 'Missed Call' and 'Notify Me' messages are generated automatically; no action is required from the caller.

From the operator's point of view, the system can work as a highly efficient alternative or convenient augmentation to Voice Mail. Voicemail customers can use the 'Who Called' service in parallel with their existing voicemail service.

Statistics collected from operators that have deployed this service show that up to 10% of subscribers return calls when they receive a 'Who Called' SMS. It clearly shows that deploying this solution can increase the number of outgoing calls from the operator's network.

Flexible subscriber profile management and self-care allows the operator to adapt the service to suit his business model, increases service convenience and reduces service help requests to the operator's customer service staff.

PROTEI Missed Call Notification can massively improve customer satisfaction in new networks experiencing 'teething problems' or difficulties with coverage. Convenient message formats make the service easy and attractive to use; either several calls can be grouped in one message by Caller ID, or a separate SMS can be created for each caller. In the latter case the system can send the message from the caller's name, allowing the recipient to call back with a minimal number of key presses.

PROTEI Missed Call Notification System is a cost-effective, high performance and scalable solution with a wide range of features to suit both new and existing mobile operators. It can be introduced both as an addition to complement an existing voicemail system, or as a standalone service package. Solutions integrated with the PROTEI VoiceMail system are also available.

The system does not require subscriber base licensing, meaning fast and hassle-free deployment and immediate accessibility for all subscribers at all times.

The Missed Call Notification System has convenient web-based administration tools for configuration management, subscriber profile management and for working with CDR and statistics.

Service Algorithms

'Who Called'

The 'Call forwarding – Not Reachable' service can be set by the subscriber (from the mobile terminal), or by MSC personnel (as the default forwarding service). A call made to an unavailable subscriber is forwarded to a system that extracts the numbers of the calling and called parties. There are three main algorithms:

(a) the system plays back a predefined voice message to the calling party and disconnects;

(b) the system releases the call with predefined release cause to use the MSC voice announcement system;

(c) the system supports CAMEL and uses appropriate algorithms.

The system stores the number of the calling party plus the date and time of the call and adds them to the message to be sent to the called party (if this is the first missed call for this subscriber, then the system forms a new message, otherwise this record will be added to the previously composed message). The composed/modified message is then sent to the SMS center using SMPP. Messages are sent using the SMS center's message replacement mechanism (replace_sm SMPP message) to avoid overflowing the cell phone memory with multiple messages when the subscriber becomes available again. This approach makes the service extremely convenient to use.

If the information exceeds the size of one message, the system can send concatenated messages or a message sequence.

'Notify Me'

The Missed Called Notification System can also notify callers when the subscriber they were trying to reach becomes available in the network again.

This service can be provided as a standalone service or to complement the 'Who Called' service.

Once the message with the list of missed calls reaches the called party, the system will send a 'Notify Me' message for the calling party to the SMSC.

Subscriber Profiles and Policy Management

The system supports flexible profile and policy management.

'White' lists of called and calling parties for the 'Who Called' and 'Notify Me' services are supported. These are lists of numbers and prefixes defined using regular expressions.

The 'white' lists of called/calling parties determines the ranges of numbers and/or separate numbers of subscribers authorized to receive messages from the 'Who Called'/'Notify Me' service respectively.

Individual subscriber profiles are supported. An individual profile has the following parameters:

- Subscription to the 'Who Called' service;
- Subscription to the 'Notify Me' service;
- Message profile (header, footer, language and template of the message).

The 'Notify Me' subscription parameter is used to disable notification of the calling party about the reappearance of the called subscriber's terminal in the network.

Subscribers can also define personal 'white' lists for the 'Notify Me' service. To protect privacy, only subscribers included in the 'white' list will receive 'Notify Me' messages. This list can be modified via SMS, USSD or from the Customer Care website.

Subscriber profiles can be managed either by the system administrator, or by subscribers themselves by means of special SMS or USSD requests processed by the special ESME connected to the SMSC.
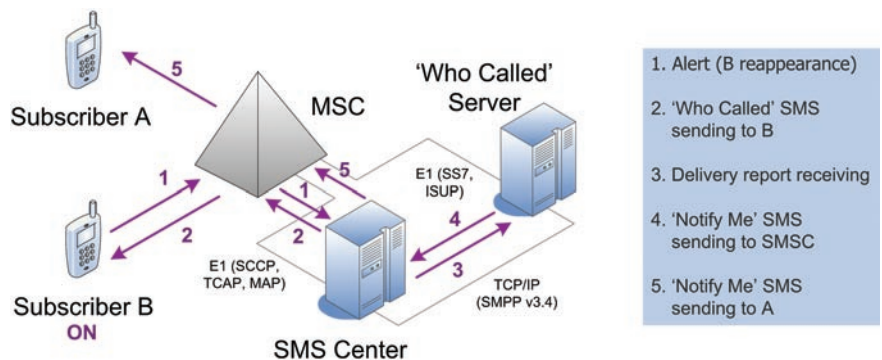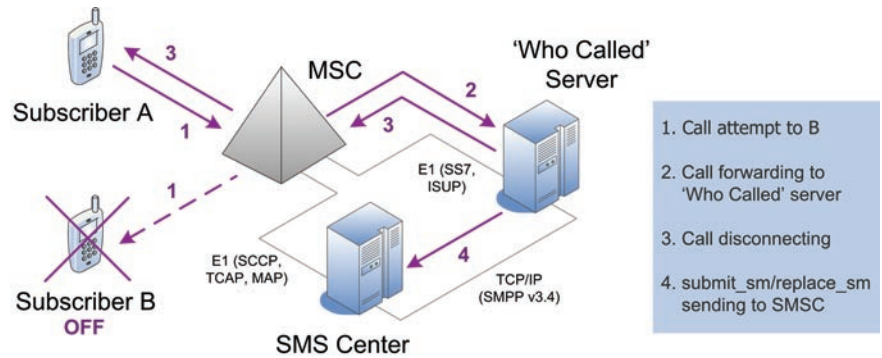
Message Format

The message format is specified by the system administrator.

Message text example with calls grouped by caller number:

"You have missed calls: <N calls from #…, last call at mm:hh, MM/DD/YYYY>, <N calls from #…, last call at mm:hh, MM/DD/YYYY>, …, <N calls from #…, last call at mm:hh, MM/DD/YYYY>."

Service Implementation Algorithm

1. Call attempt to B
2. Call forwarding to 'Who Called' server
3. Call disconnecting
4. submit_sm/replace_sm sending to SMSC

1. Alert (B reappearance)
2. 'Who Called' SMS sending to B
3. Delivery report receiving
4. 'Notify Me' SMS sending to SMSC
5. 'Notify Me' SMS sending to A

Event and Alarm Logging

PROTEI missed called notification system ('Who Called') has flexible event logging and statistics collection subsystems that allow collection of all information necessary analysis of system performance and business parameters.

The following information is available from the event logging subsystem:
- Incoming calls log and counters;
- SMS sending log and counters;
- SMS delivery log and counters;
- Profile change log and counters;
- Alarm log (SNMP optionally available).

Administration and Management

- SS7 settings management;
- Service parameters management;
- Subscriber profile management;
- Message management;
- SMPP connection parameters management;
- Statistic and CDR information viewing.

Communication with the Telecom Equipment

- MSC interface: E1s, SS7;
- SMSC interface: SMPP v3.4 over TCP/IP.

System Architecture, Capacity and Principles of Scaling

PROTEI Missed Call Notification is a horizontally scalable carrier-class system. Automatic configuration synchronization between modules is supported. Network based architecture additionally increases system reliability. Modules are used in load-sharing mode. If one of the modules fails, the traffic is redistributed among other modules without any service interruption.

The capacity of one module is 4E1 (when using Service Node scheme), up to 8 signaling links, up to 500 TPS (transaction per second).

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