Who Called
Missed Call Notification System

General Information

The PROTEI missed called notification system ("Who Called") uses SMS technology to provide a very convenient service to the mobile subscribers – information about calls that were missed by the subscribers during the period when they were unavailable for the incoming calls (out of the network coverage, the telephone was switched off, etc.) by sending short messages (SMS) with the list of the telephone numbers from which the calls were initiated. It also can notify the calling party when the called party is back on the network or when he became available for the incoming calls (the "Notify Me" subservice).

The main purpose of the service is to increase the subscriber's availability.

It's known, that in many countries calling subscribers due to their mentality don't leave messages in voice mailbox but those which were not reachable however want to know Who Called them when they were unavailable for the incoming calls.

On the other hand calling subscribers whose call was unsuccessful would like to know when the unreachable subscriber had returned to the network.

PROTEI Missed Call Notification System fully satisfies to their demands. "Who Called" and "Notify Me" messages will be generated automatically, without any required actions from the caller.

From the Operator's point of view the System can work as a highly efficient alternative or convenient addition to the Voice Mail – up to operator's business idea. Moreover, Operator's voicemail users can receive Who Called service additionally to (not instead of) their existing VoiceMail service provisioned by existing VoiceMail platform.

According to the statistical information collected from the Operator's that had deployed this service, up to 10% of subscribers recalls when receive Who Called SMS. It clearly shows that deployment of this solution increases successful call share that directly increases operator's revenues.

Flexible subscribers' profile management and self-management allows adopting the service to the operator business model, increases service convenience and reduces traffic to the Operator's Customer Service related to the service configuration.

Service deployment radically decreases the subscriber's dissatisfaction in case of coverage problems for young operators and shows real Operator's care about its subscribers. Convenient message formats stimulate service using. Either several calls can be grouped in one message by Caller Id or separate SMS can be created for each Caller. In the last case the system can send this message from the caller name that will allow to the called subscriber fast "one click recall".

PROTEI missed called 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 that can be introduced both as an addition to the existing voicemail system or as standalone service packet. Solutions integrated with Protei voicemail system are also available.

System is not licensed for the subscriber's base that allows fast and easy feature activation for all subscribers' base.

System has convenient WEB-based administration tools allowing configuration management, subscriber's profile management, efficient working with CDR and statistics.

Service Algorithms

"Who Called"

For using the service "Call forwarding – Not Reachable" the "Who Called" server has to be set. Forwarding can be set by the subscriber (from the mobile terminal), or by the MSC personnel (as the default forwarding service). The call to the unavailable subscriber is forwarded to the system that extracts the numbers of the calling and the initially 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 MSC voice announcement system;

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

The system stores the number of the calling party, date, and time of the call and adds them to the message to be sent to the calling party (if this is the first call for this subscriber, then the system forms new message, otherwise this record will be added to the previously composed message). Then the composed/modified message is sent to the SMS center via SMPP.

Messages are sent using the SMS center's message replacement mechanism via replace_sm SMPP message to avoid overflowing the memory of the cell phone with numerous messages when the subscriber becomes available. Such approach dramatically increases the convenience of the service using.

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

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"Notify Me"

Another service provided by the Missed Called Notification System is the notification of the reappearance of the previously unavailable subscriber in the network.

This service can be provided as an additional feature of the "Who Called" service or as a standalone 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 SMSC

Subscriber Profiles and Policy Management

The system supports flexible profile and policy management.

"White lists" of the 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).

«Notify Me» subscription parameter is used to disable the notification of the calling party about the reappearance of the subscriber's terminal on the network.

Also subscriber can define personal white list for Notify Me service. Only subscribers included in the white list will receive Notify Me messages. Such approach allows saving user privacy. This list can be modified via SMS, USSD or from Customer Care WEB-site.
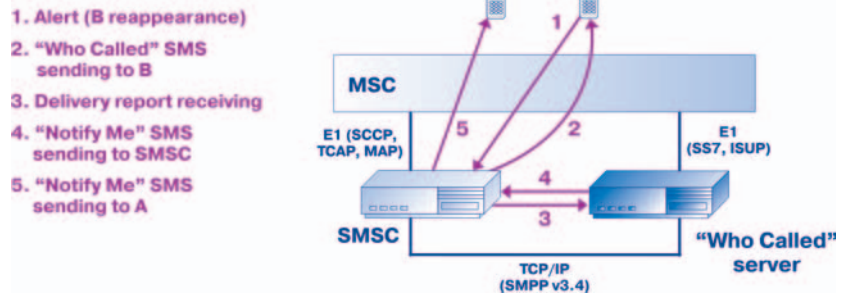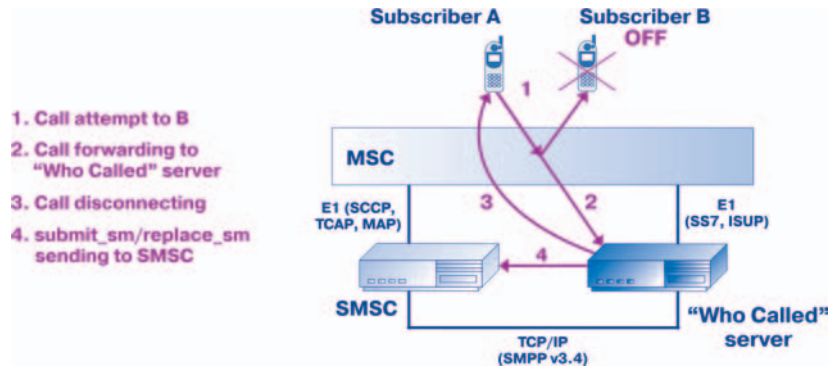
Subscriber profiles can be managed either by the System Administrator, or by the subscribers themselves by means of special SMS or USSD requests processed by the special ESME connected to the SMSC.

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>."

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

Service implementation algorithm

Event and Alarm Logging

The Protei missed called notification system ("Who Called") has flexible event logging and statistics collection subsystems that allow collection of all information that is necessary for system functioning analysis and business-parameters analysis.

The following information is available from 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's 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

The PROTEI missed called notification system ("Who Called") is a carrier-class system that can be scaled horizontally. Automatic configuration synchronization between the modules is supported. Network based architecture additionally increases system reliability. The modules are used in the load-sharing mode. If one of the modules fails, the traffic is redistributed among the other modules without any service interruption.

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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