CAMEL Gateway

System Description

PROTEI CAMEL gateway is a powerful CAMEL enabler intended for fast and easy Intelligent Networks (IN) services deployment in mobile networks using CAMEL Application Part (CAP) protocols. CAMEL gateway is a key element for the successful deployment of real VHE services. The server allows real-time control of the calls, SMS- and GPRS sessions in GSM networks using external applications that communicate with CAMEL gateway via Application Programming Interface (API). Horizontal scaling architecture provides high reliability and possibility to increase system throughput according to the network growth. Support of SIGTRAN allows easy integration of PROTEI CAMEL gateway into the next generation mobile networks. One of PROTEI CAMEL-gateway unique features is possibility to forward initial DP (service request) to the external SCP (Camel-proxy mode) that allows using this system simultaneously with already installed SCPs. System supports CAMEL phases 2 and 3 specifications and is compatible with the main MSC vendors.

The ability to control calls, SMS messages, GPRS sessions (SMS and GPRS services are supported by CAMEL Phase 3 and higher), and the real-time interaction with the subscribers opens new horizons for development and implementation of a broad range of the additional services available to the clients subscribed to CAMEL enabled services in their home mobile network. The issues of development and deployment of the logic of the services and their tariffs may be solved by the mobile telecom operators, as well as the external service providers that have access to CAMEL Gateway via an API.

One of the most relevant services that can be offered to the subscribers using this method is Hot Billing for all subscribers of the mobile network.

Technology Overview

CAMEL is a part of Virtual Home Environment (VHE) concept and provides a full range of additional intelligent services to the subscribers in the home networks and in CAMEL enabled visitor networks. It does not require modernization of the operators' networking equipment or connection of the voice channels for transmitting traffic through the network's transport nodes. This makes CAMEL the most efficient method for providing additional services or roaming services to the mobile subscribers.

An important feature of this technology is the fact that the services implemented via the CAMEL protocol do not require international standardization or special interactions between the mobile telecommunications service providers. Thus, even the most exclusive and nonstandard service implemented in the home network of one service provider becomes available through CAMEL technologies to all subscribers of this provider regardless their location.

Open APIs usage (PARLAY, and others) for designing call control applications opens new opportunities for creation of the non-standard operator specific services. Such services can be developed by Operator's specialists or by third party service-providers. For simplifing service development embedded service creation environment is supported. Such approach is much more flexible comparing with traditional SCP architecture because Operator receives not only services developed by SCP vendor but also powerful and flexible tool for service creation. It allows the Operator dramatically decrease the "time to market" for deploying new innovative services, that will attract the subscribers and increase Operator's competitiveness.

Service Logic Definition

The logic of the providing services to the subscribers is determined by the external API applications that interact with mobile networks via the CAMEL Gateway. When providing services, the home location register (HLR) and the visitor location registers (VLR) exchange information about the client's subscription to CAMEL services (CSI). According to the information from the external applications, the gateway controls calls, SMS exchange or GPRS sessions, as well as other procedures provided by the particular service. A typical request from MSC/gsmSSF to CAMEL Gateway contains a service key which should correspond to a particular external application.Signal exchange between the network nodes and IN nodes contains only those procedures and information about the services, which are supported by the mobile network that services the subscribers depending on the supported CAMEL version.

System Features

- Providing a wide range of the prepaid services to the subscribers with real-time billing in the home and in the visited networks;

- Real-time control, logging, and accounting of incoming, outgoing, and forwarded calls in the home and in the visited networks;

- Control, logging, and accounting of outgoing SMS messages in the home and in the visited networks (available in CAMEL Phase 3 and higher);

- Real-time control and accounting (by the time or by the volume) of GPRS sessions in the home and in the visited networks (available in CAMEL Phase 3 and higher);

- Using voice prompts and announcements available at the MSC where the subscriber is registered;

- Determining the current subscriber location (e.g. busy, out of the network range, etc.);

- Managing of the call processing logic and service accounting logic by the external applications connected via API;

- Flexible adaptation of the data formats included in Call Detail Records to conform the requirements of the operators and the service providers;

- Flexible implementation of intelligent services based on the CAMEL Phase 2 and Phase 3 features and API application features;

- Supporting Logic Line (Virtual Number) service;

- Using as CAMEL proxy;

- Implementing Virtual Private Networks (VPN);
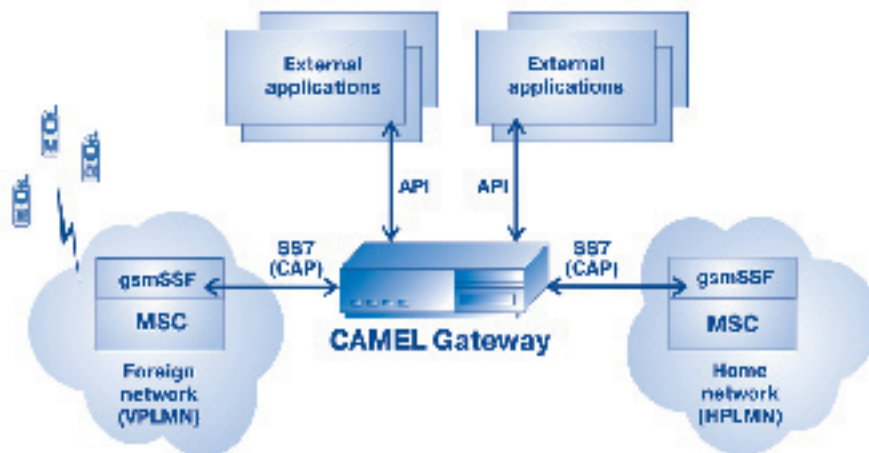
- Supporting Advice of the Charge (AoC);

- Collecting statistics on the provided services;

- Configuring and monitoring CAMEL Gateway using any kind of the remote access technology. All system parameters may be configured through the editing configuration files and/or using the Web-based) Administration software;

- Flexible configuration of SS7 parameters;

- Logging transaction results in the log files with various levels of detailing;

- Alarm logging with SNMP support.

System architecture, capacity, and principles of scalability

CAMEL Gateway consists of the following subsystems:

- Subsystem for interaction with mobile networks via SS7/CAP;

- Subsystem for interaction with the external applications via API over TCP/IP;

- Subsystem for logic interaction;

- Subsystem for logging and statistics collecting;

- Subsystem for Administration and maintenance.

PROTEI CAMEL gateway is a carrier-class system that can be scaled horizontally. When the productivity or capacity of the server reaches its maximum, additional modules could be used. Automatic configuration synchronization between the modules is supported.

The system has a network architecture, which additionally increases its reliability. Several system modules are used in lte oad-sharing mode. If one of the modules fails, traffic is redistributed among the other modules without any service interruption.

Capacity of one module is 4E1, up to 32 signaling links, up to 500 TPS (transaction per second).

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