



MVNO/ Private LTE Solutions



PROTEI Company Profile

PROTEI is an international telecommunication systems vendor operating in Russia, Eastern Europe, Central Asia, Latin America, the Middle East & North Africa, having extensive know-how and a proven track record of over 19 years in the telecommunication market.

Under PROTEI brand we present reliable, cost effective, carrier-class solutions.

Using the latest convergent technologies implemented in our products both the most innovative services such as data traffic management and well-known ones such as Steering of roaming or SMS can be delivered with maximum efficiency. PROTEI product line covers all needs of mobile operators: core solutions (like HLR/HSS), roaming management, IN & VAS, messaging and so on. Responding to the requirements of the telecom market, PROTEI offers comprehensive solutions for building MVNO and Private LTE/5G networks.

Our products are highly customizable and can be altered according to any requirements. PROTEI MVNO/MVNE and Private LTE solutions will help operators and enterprises to provide a steady high-quality communication, increase revenues and reinforce a position on a market.

PROTEI serves more than 300 renowned customers in over 30 countries to cater 200 million subscribers worldwide.

PROTEI employs more than 400 highly skilled professionals of whom approximately 70% are involved in research and development.

PROTEI MENA Branch (formerly known as Silat Solutions) was formed in 2009 for expand PROTEI's HQ operations into the MENA region.

PROTEI MENA Branch is the central base of operations for PROTEI's high-caliber and Arabic-speaking professionals, who capitalize on sales, marketing, implementation, and technical support services exclusively to PROTEI customers.

It is worth mentioning that throughout these bountiful years, MENA Regional Branch has established group strategic relationships that have resulted in successfully achieving over 50 installations in 8 countries.

MVNO and Private LTE/5G Solutions

According to recent reports by analysts mobile virtual network operators (MVNOs) are expected to grow strongly worldwide as regulators embrace a more competitive market and the mobile industry turns to new areas for revenue growth. MVNO market is expanding dynamically due to mining new revenue streams in such areas as enterprise mobile and M2M projects being an important part of the Internet of Things (IoT). PROTEI is closely following all the trends and doing the best to be ready to answer market demands.

PROTEI product line is fully equipped to propose turn-key set for full-MVNO creation. PROTEI MVNO portfolio includes both core products such as HLR/HSS, STP, GMSC, media-gateways, PCEF (DPI) and VAS products traditional for PROTEI such as SCP, SMSC and so on. Several products like HLR/HSS and OCS (Prepaid) specially adapted for MVNO/MVNE needs allowing building several MVNO sharing one platform.

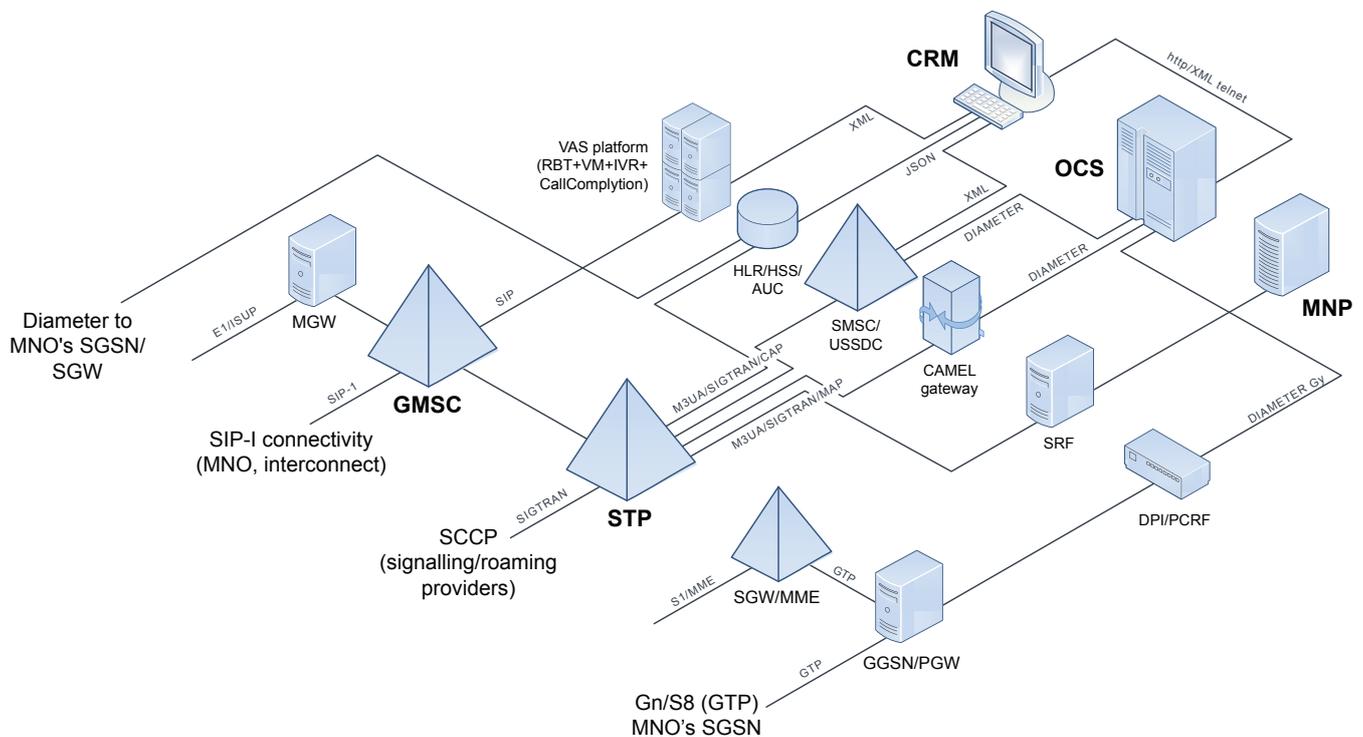
Private LTE/5G or Campus Networks model - a mobile communication network built and operated in the interests of enterprise customers are also can be efficiently deployed for servicing IoT users.

PROTEI offers comprehensive solutions for building Private LTE/5G networks. The complex provides compatibility with eNodeB and gNodeB of various vendors, which makes possible to organize the construction of Private LTE/5G networks taking into account the national and industry specifics of regulation, as well as taking into account the peculiarities of the object.

Turn-key Private LTE bundle offered by PROTEI, provides the ability to deploy the Private LTE/5G Option 3 NSA network core in the optimal way, with the ability to scale from hundreds to tens of thousands of devices and subscribers. The composition of the complex depends on the target set of services provided, and may include:

- Basic set of platforms for building the Private LTE / 5G NSA core (SGW, MME, HSS, PGW)
- Policy Management Platform (PCRF)
- A platform for deep packet traffic inspection (DPI)

Our products follow all mainstreams in mobile technologies and present the best way for prompt launching any MVNO projects.





Core Network Solutions

Home Location Register (HLR/HSS)

PROTEI Home Location Register is a cost-effective, high performance and scalable solution to suit both – new and existing mobile Operators, mobile virtual network operators (MVNO), service and content providers. Scalable architecture and flexible throughput licensing of PROTEI HLR/HSS enables an Operator or provider to select a solution that not only mirrors the revenue stream of today, but can be used to meet Operator tomorrow's needs, IoT or Private LTE/5G for example.

PROTEI Home Location Register is a central database that contains details of each mobile phone subscriber that is authorized to use the GSM core network. Single database remains for several HLR/HSS front-ends. PROTEI HLR contains user information such as account information, account status, user preferences, features subscribed to by the user, user's current location, etc. Integrated Authentication Centre (AuC) supports all main authentication algorithms such as Milenage, COMP 128 v2/v3 and TUAK.

Subscriber's data and supported protocols are implemented in strict accordance with 3GPP standards (29.002, 23.008) that ensures compatibility of PROTEI HLR/HSS with network elements of any vendor.

The LTE-HSS subscriber profile leverages the legacy 3GPP Release-6 compliant Packet-Switched Domain subscriber profile. New LTE-specific subscription fields have been added to the profile. The PDN/EPS context required for LTE is supported alongside the GPRS context already existing for GPRS/UMTS. Operators therefore have the choice to provision one or the other (or both). PROTEI HLR/HSS supports S6a interface for easy integration into LTE networks and Sh, Cx interfaces for serving IMS users. Implementation of all these interfaces is fully compliant with appropriate 3GPP standards (29.272, 29.273, ect).

PROTEI HLR/HSS supports convenient provisioning interface to enable smooth system integration with Operator's BSS and performing appropriate management operations.

Gateway Mobile Switching Center (GMSC)

Gateway Mobile Switching Center PROTEI GMSC is intended to serve voice calls of GSM/UMTS subscribers and specially developed to suit needs of mobile virtual network operators (MVNO).

Functionally PROTEI GMSC is based on Soft-switch class 4 equipped with additional functional modules that are specific for GMSC such as HLR interrogation module supporting MAP and gsmSSF module supporting CAP.

System supports a range of signalling protocols and their extensions that ensure interoperability with core MNO networks built on the equipment of any vendor. Interaction with network core may be done via SIP/SIP-I/SIP-T or H.323; interworking with traditional (legacy) PSTN and PLMN network is organized using PROTEI mGate. ITG media gateways.

Intelligent and powerful call routing subsystem enables multi-criteria routing of inbound and outbound calls basing on various parameters, including SLA and the traffic intensity per directions. System supports T-CSI, M-CSI and N-CSI triggering to utilize maximum potential of CAMEL capabilities.

Equipment Identity Register (EIR)

Mobile phone theft has become a growing problem worldwide, with hundreds of thousands of phones reported stolen each year. PROTEI EIR enables network Operators to enter the IMEI of stolen handsets into a "blacklist", thus preventing them from being registered on the network.

PROTEI EIR provides automatic device detection functionality required for identification of changes of subscriber's device. Every change of subscriber's device will be detected by PROTEI EIR. Detection is based on MAP procedures (MAP-CHECK-IMEI) in full accordance with international standards. The change of subscriber's device leads to the change of the IMEI associated with the MSISDN, so PROTEI EIR can detect these changes and verify if the new IMEI is in the blacklist or not, notifying external systems in the latter case.

PROTEI EIR is based on PROTEI xVLR solution that is an “umbrella” platform providing the ability to process, store and transmit location information regarding subscribers of mobile networks provided by switching elements to external applications. The platform is able to process information that is available through core network vendor’s proprietary features (like NSN VLR feature “Subscriber Data Feed from VLR”) or using standard MAP capabilities such as MAP-NOTE-MM-EVENT (M-CSI triggering), MAP-CHECK-IMEI or MAP-SUBSCRIBER-LOCATION-REPORT. Collected data can be efficiently used for such services as geographically targeted SMS campaigns, equipment identity registration, automatic device detection, border roaming services, loyalty services and many others.

Signal Transfer Point (STP)

PROTEI STP is highly effective solution for signaling messages routing. All tasks connected with extra flexible signaling traffic routing, special routing for particular messages, necessity to connect more than one roaming provider can be solved using by PROTEI STP. It’s also a proven solution for deploying active steering platform SMS Firewall, or SS7 Firewall.

PROTEI STP functionality:

- Flexible routing by SCCP-level parameters;
- Special TT (-s) for outgoing traffic;
- Flexible routes’ redundancy;
- Routing by TCAP operation codes (for MAP & CAP);
- E1/SS7 or SIGTRAN connectivity.

Diameter Real-Time Mediation

Diameter is a key next-generation signaling protocol for contemporary all-IP networks, carrying policy, charging, mobility management, and authentication, authorization and accounting (AAA) traffic.

Diameter traffic will accelerate quickly with the increasing of LTE and IMS network rollouts, which could create congestion, scalability and interoperability issues at the signaling layer. These issues may be especially important and complicated for Operators taking into account that as a protocol Diameter is not well defined and some education in the industry will be required to make the best use of it. There are a lot of extensions to Diameter that may lead to interoperability problems also.

PROTEI Diameter Real-Time Mediation Platform (DRTM) enables single connection point for all Diameter-based entities interacting within Operator’s network. The new network element is called the Diameter Real-Time Mediation Platform (DRTM) and it helps Operators manage services and applications on 3G and all-IP LTE and IMS networks. PROTEI DRTM centralizes routing, traffic management and load-balancing tasks to create an architecture that enables Operator’s IMS and LTE networks to grow incrementally to support increasing service and traffic demands.

The DRTM deployment reduces the complexity of connecting, provisioning and interoperating essential Diameter-based equipment.

PROTEI SS7 Firewall

PROTEI SS7 Firewall is intended to help operators in monitoring, controlling and managing SS7 traffic with other national and/or international operators, carriers and other telecom services providers. PROTEI SS7 Firewall is designed to detect and handle unexpected or unconventional SS7 messages through applying appropriate MTP, SCCP, TCAP and MAP policing rules.

Furthermore, and in order to assure full SS7 protection capabilities, PROTEI SS7 Firewall adopts the GSMA definition of SS7 attacks specified in GSMA IR.82 and in updates to specifications from the GSMA Fraud and Security Group (FS.11, FS.07, IR.70, and IR.71).

PROTEI SS7 Firewall supports several network protection approaches: Monitoring and Alerting, Basic Policing Rules, Advanced Policing Rules.

The system is an effective tool for preventing network and subscriber oriented SS7 attacks such as spamming and flooding, fraud generation, tracking, Identity theft, DoS (Denial of service) or Illegal interception. PROTEI SS7 Firewall can be easily upgrade to serve SMS-FW functionalities.

The system provides a flexible routing management and policy management individually for each SS7 connection (PC or GT), wide range of filtering criteria for SS7 messages, SS7 time window to control MSU’s flow from a certain SS7 connection (PC or GT), SS7 Anti-SPAM functionality protecting the network from mass MSU sending (PC or GT), network addresses masking functionality, personalized Black and White Lists and support of GSM MAP phase I, II, III, HSL, SIGTRAN and SNMP Version 1,2 and 3.

Evolved Packet Core (EPC)

PROTEI EPC

PROTEI EPC is the set of platforms for LTE Evolved Packet Core (EPC) creation enabling intelligent, reliable, rich services and security for 4G operators. The EPC is designed to provide an all-IP, flat architecture which provides high throughput and reduced latency. EPCs reduce costs and support real-time media-rich services with enhanced quality of experience while also providing interworking with legacy 2G/3G networks connected via external SGSN. The EPC controls all of the components of a 4G network and the user devices they communicate with.

PROTEI EPC provides enhanced service control, advanced provisioning and ensures efficient use of network resources. The EPC components provide the functionality of access control, packet routing and transfer, mobility management, security, radio resource and network management. PROTEI EPC is a set of solutions consisting of MME, SGW (Serving GW), PDN GW/GGSN, and optionally HLR/HSS and PCRF components, or any combination of these. Each of solutions may be deployed either separately or as a part of the turn-key bundle. PROTEI EPC elements support from 100 to 1 mln simultaneously attached subscribers per node that makes PROTEI EPC suitable for mobile operators having different subscriber base and network topology, including Private LTE/5G.

GGSN/PDN GW

PROTEI GGSN/PDN-GW acts as a gateway GPRS support node (GGSN) in 2G and 3G network architecture, a Packet Data Network Gateway (PDN-GW) in a 4G/LTE network architecture. GPRS Gateway Service Node is the heart of PS Core Network of mobile operator responsible for data routing between GPRS Core network via GTP protocol and external IP-networks. GGSN takes part in PDP context activation sending authentication requests to the RADIUS server, as well as interaction with the DNS servers to determine IP-address assigned to the requested APN.

PROTEI GGSN/PDN-GW is developed in full accordance with international standards and allows easy integration into a packet network via Gi/SGi interface, via Gn interface with SGSN(s),

via S5/S8 interface with SGW(s) of LTE networks to allow signaling and data path for establishing and maintaining subscriber PDP contexts, via Gy and Gx interfaces using in-build PCEF providing charging for data services.

In case of data traffic increasing over one GGSN/PDN-GW capacity additional modules are installed to provide greater total throughput of the entire system which makes PROTEI GGSN/PDN-GW flexibly scalable.

SGW

PROTEI SGW routes and forwards user data packets, while also acting as the mobility anchor for the user plane during inter-eNodeB handovers and as the anchor for mobility between LTE and other 3GPP technologies. It retains information about the bearers when the UE (User Equipment) is in idle mode. It manages and stores UE contexts, e.g. parameters of the IP bearer service, network internal routing information. PROTEI SGW supports default and dedicated bearers, multiple sessions/multiple bearers per subscriber, S5 and S8 interfaces for PDN GW interaction and S1-U for interaction with eNodeBs.

MME

PROTEI MME is the key control-node for the LTE access-network that processes signalling between the UE and the core network. It manages establishment, maintenance and release of bearers and the connection, authentication (by interacting with the HSS) and security between the UE and the network. The MME Performs mobility management, like tracking UE location and handover, and manages subscription profile and service connectivity. It checks the authorization of the UE and enforces UE roaming restrictions.

PROTEI MME implemented in full accordance with appropriate 3GPP standards and supports all necessary features such as default and dedicated bearer establishment (with up to 8 bearers per subscriber), ciphering and integrity protection of NAS messages, all kind of signaling procedures including attach/detach, PGW & SGW selection, S1, inter-SGW and inter-MME handovers and so on. PROTEI SGW supports S6a interface for HSS interaction, S1-MME interface, SGs and Sv interfaces.



Roaming Solutions

Steering of Roaming Platform

Steering of roaming system enables powerful and flexible network selection management to encourage the “right” roaming network choice for subscribers (Steering of Roaming concept).

Registration procedure control for outbound roamers is performed in full accordance with IR-73 that is main GSMA regulation document related to the steering services and allows the most efficient deployment of Steering of Roaming services as well as influencing roaming partners with a view to optimizing roaming agreements and providing required quality of service.

Steering procedure may be based on several network selection criteria like network priority, roaming KPI (share of successful registrations or share of unique subscribers registered in particular network, number of various errors), traffic proportions etc.

In addition to traditional steering functionality powerful profile management functionality is supported by the system as well. Statistical subsystem accumulates all information related to roamers’ behavior and makes possible detailed and efficient analysis of this information together with roaming traffic structure using appropriate reporting tools.

Thus, deployment of PROTEI Steering platform efficiently covers many business and commercial tasks related to outbound roaming optimization.

Diameter front-end enables LTE traffic handling to deliver steering services for LTE network.

PROTEI Steering Platform supports Border Roaming Prevention functionality giving mobile operators the ability to prevent their own subscribers from accidentally roaming on a foreign network while still within their home country/zone.

Statistical and reporting subsystem is a powerful and useful tool for both technical and commercial teams of the operator allowing KPI’s monitoring and report creation both for troubleshooting of roaming problems and deep in-sight view to roaming traffic and trends. Subsystem offers its

features through a user friendly web-based interface, through which reports, alarms, and statistics can be managed and acquired. Convenient reporting framework allows report creation in text and graphical formats.

Roaming Assistant

PROTEI Roaming Assistant is a highly effective application for correcting typical dialing errors made by roamers.

It also allows them to access short number services from their home network while in roaming, leading to a significant increase in the proportion of successful calls and increasing Operator’s income.

This service can be deployed both for inbound roamers (ISUP-based) and for outbound roamers (CAMEL-based).

Multi IMSI Roaming Gateway

Multi IMSI roaming gateway is intended to expand roaming geography for MVNO, small and/or independent mobile Operators (named Roaming Clients) by using roaming agreements and subscription of well-established mobile Operators (sometime named Donors or Roaming Brokers).

Basing on PROTEI Multi-IMSI Roaming Gateway either traditional dual-IMSI roaming services or innovative dynamic multi-IMSI roaming services may be deployed in optimal way. Multi-IMSI roaming allows providing alternative roaming services for GSM/UMTS network subscribers by using dynamically loaded alternative subscriptions of the visited Operator (guest network). This solution makes it possible to provide a local number and access to all local services for the roamer who will be able to enjoy cheap or free local incoming calls, cheap outbound calls and attractive data prices without losing the accessibility of the roamer at his/her main phone number.



Messaging Solutions

SMS Center

PROTEI SMSC is a carrier-class high-performance SMS center that includes traditional and innovative SMS features. Range of the supported protocols allows deploying PROTEI SMSC through GSM/UMTS or IS-41 (CDMA) networks. Support of SIGTRAN allows easy deployment across the next generation mobile networks. Flexible delivery scenario management, embedded “First Delivery Attempt” feature, policy management, convenient licensing principles and powerful SMS routing subsystem make SMSC a perfect choice for Operator’s needs.

Routing and bandwidth configuration tools support fully functional SMPP interface with efficient access policy for interaction with external applications. Horizontal scaling architecture allows to achieve high reliability and to adjust SMSC performance as network grows. Features like SMS forwarding, copy, auto-reply, personalized black and white lists, detailed report increase service convenience for subscribers.

USSD Server

PROTEI USSD server exchanges USSD messages between the mobile subscribers and the external applications through GSM networks. With PROTEI USSD server Operators is able to provide balance enquiry, voucher activation and other customer care services using the most efficient and convenient way. PROTEI USSD server supports flexible USSD message routing based on the service keys, message body and source of MSC address with possibility of access policy and bandwidth management for each application individually. USSD stage I and stage II are supported – that allows creating dialogue USSD services with multilevel USSD-menu. SMPP v3.4 provides fast and easy integration with external content-providers.

PROTEI USSD server has embedded tools for convenient and flexible USSD-menu construction (SMPP-portal software package) and supports open XML and ODBC interfaces for integration with external information systems and databases. On-line charging interface is supported.

SMS Firewall

PROTEI SMS Firewall is intended to protect Operator’s network from main threats related to SMS spam and fraud. The primary objectives of the SMS security solution are to detect and mitigate SMS frauds caused by:

- SMS spoofing;
- SMS faking;
- SMS flooding;
- other types of technical fraud.

Solution allows protecting Operator’s network and Operator’s subscribers against unauthorized SMS traffic (both application originated SMPP traffic and inbound/transit SS7 mobile originated traffic).

Filtering criteria can be defined for different type of traffic. Rules can be defined for MO or MT SMS, for particular MSISDN range, Operator, Global Title range or SMPP message sender. These criteria include list of SS7 parameters to be verified when processing inbound MO or MT messages coming from abroad, as well as list of figures defining bandwidth and routing limitations for SMS traffic like limits for SMS traffic intensity from any particular MSISDN, SMSC or other network elements, range of destination numbers to which messages from the source mentioned above can be addressed, range of origination numbers messages can be sent from etc).

Anti-spoofing and anti-faking filtering and detection capabilities are supported according to IR71 GSMA document.

PROTEI SMS Firewall supports enhanced anti-spam capabilities such as keyword-based filtering, intellectual spam detection basing on heuristic message body analysis and statistical criteria such as number of same/similar messages from one source, from one network, to one recipient and so on. Personalized white and black lists can be implemented basing on PROTEI SMS Firewall as well.



Intelligent Network & VAS

CAMEL Gateway/Proxy

PROTEI CAMEL gateway is an ultimately efficient tool for supporting operator specific services in GSM/3G/IMS networks. The CAMEL-enabled server for supporting operator specific services (CAMEL Gateway) allows to manage telecommunications services at GSM/3G/IMS networks by service logic application defining call, SMS and data session scenarios using API. CAMEL-gateway allows efficient deployment of wide range of IN services in any CAMEL-enabled network, both for prepaid and postpaid subscribers. Together with service logic applications may be created/delivered by PROTEI, service provider or operator's experts CAMEL-gateway operates as fully functional SCP delivering flexibility and convenience in new services creation and deployment.

The system allows real-time controlling voice call, SMS- and GPRS-sessions in GSM networks, using service logic applications.

Convenient Service Creation Environment being an additional component of CAMEL-gateway allows easy service creation and service tuning for wide range of VAS. Embedded CAMEL-proxy functionality allows PROTEI CAMEL Gateway to be easily integrated into existing IN, allowing new services to be deployed with no disruption to the delivery of previously available services. Horizontal scalability and easy integration with existing SCP installations make PROTEI CAMEL Gateway an ideal solution for providing IN-based Value Added Services in networks of all sizes. SIGTRAN support ensures easy integration into next-generation mobile networks.

Such services as black and white lists, inbound consumption counting, number translation, mobile VPN, and others can be efficiently deployed basing on PROTEI CAMEL gateway/proxy.

Call Completion Suite

People need to stay in touch even when they're not available. Whether its consumer or business use, voicemail has become an expected service by wireless subscribers so they can receive and retrieve their messages at any time and from anywhere.

PROTEI Call Completion Suite is intended to maximize number of successfully completed calls in Operator's network by capturing of all unsuccessful calls that usually cannot be successfully completed due to different reasons.

Solution includes several services allowing Operator to suite needs of different segments of Operator's subscriber base.

PROTEI Call Completion 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 could be introduced both as an addition to existing voicemail system or as standalone service packet. Solutions integrated with voicemail system are also available.

The following services can be implemented basing on this platform:

- Missed Call Notification;
- Notify Me;
- Call Completion;
- Video Call Completion;
- Video/Voice SMS;
- Comfortable Jump;
- Call Collect (Pay4Me, Sponsored Call);
- Voice Video Mail.

PROTEI Call Completion platform allows remote administration and management via any remote access technology like telnet session via secure connection TCP/IP/SSH. WEB-based administration and maintenance kit is provided for service provisioning operations, CDR and statistic information viewing, report generation.

Personal Ring Back Tone & Video Ring Back Tone

Its penetration is still visibly growing and generating stable income for Operators. PROTEI RBT system is a fast way to offer Ring Back Tone service to subscribers. Due to platform's flexibility and scalability the system can be easily adjusted according to current or new Operator's requirements.

In addition of traditional features there are a lot of advanced options, for example: "Tone like my friend has" (Copy RBT service), "Present tone to friends", Corporate RBT, different tone prices per purchase channel, Hang-up SMS and Anti RBT.

The solution allows quickly extend Operator's service promotional tools, forming new marketing proposals like: "the second melody as a gift", "get bonus points for inviting a friend", "free trial period", "forth melody as a gift", "first month of subscription is free".

Different ring back tones can be set to particular callers, caller groups and unspecified numbers, depending on date, weekday and/or time. Tone management via SMS/USSD, IVR or convenient Web-interface. Lists of melodies can be updated dynamically from external files. Recording personal phrases is also available.

The system is horizontally scalable. When one of subsystems reaches its performance threshold, appropriate additional modules are brought on-line. The system has network architecture, which additionally increases its reliability.

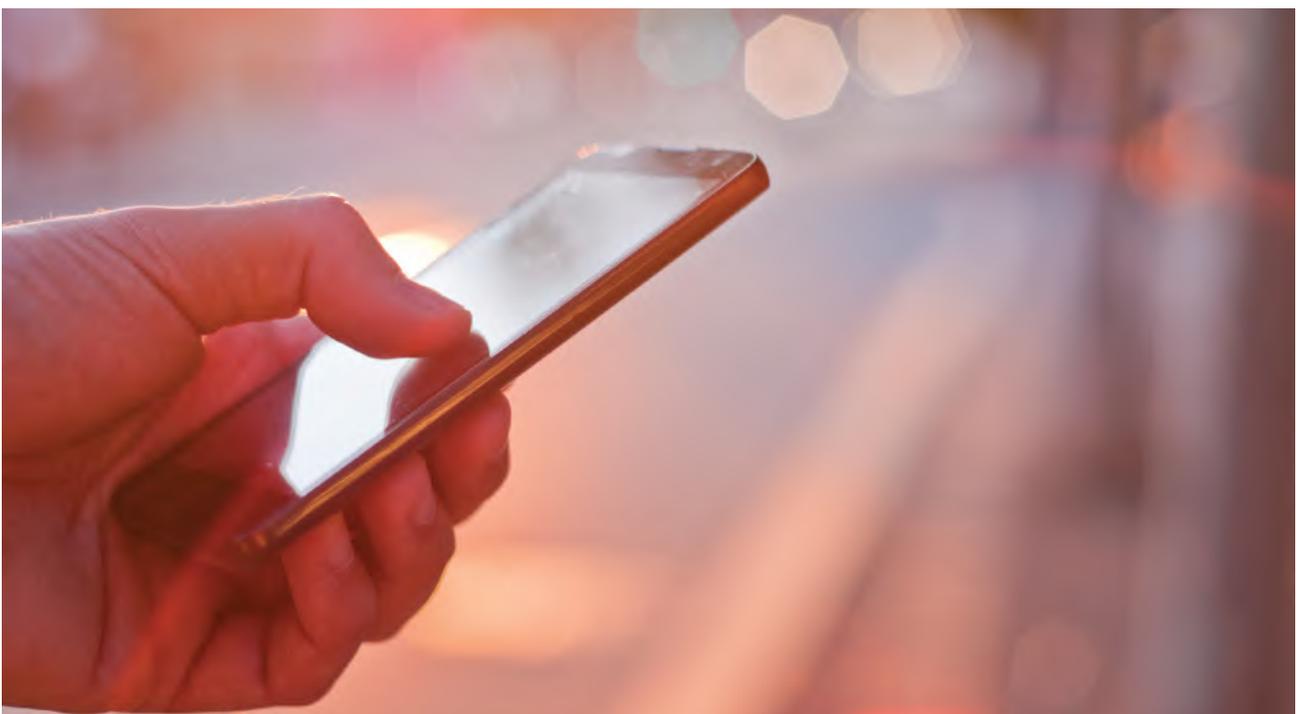
Sponsored Call

The system allows end-users, subscribed to specific thematic information channels, to make free or discounted calls while receiving attractive advertisements. When subscriber makes a call, prior to establishing a connection, he/she receives a multimedia promotional audio or video from an advertiser.

After that he/she receives different bonuses: certain number of call minutes paid by the advertiser during a call, discount for minutes' price, certain number of call minutes paid by the advertiser during a day, week, month etc.

Advertisement is played only within thematic channels and only to subscribers who have subscribed to it. Subscription can be made by SMS/USSD, through IVR or via WEB-interface. Subscriber may be subscribed to several thematic channels simultaneously. The Operator may set limits on the total number of playable subscriber commercials and on the total number of bonuses.

Self-subscription via WEB-interface can also be available. Subscribers can subscribe to several thematic channels simultaneously, but the operator can set limits on the total number of channels or on the total amount of bonuses, daily/monthly available to a subscriber. Unsubscription from a channel is also carried out by sending an SMS/USSD-message to one of the numbers corresponding to the thematic channel or through the IVR using the DTMF-menu.





Data Traffic and Policy Management

DPI Platform

Powerful and flexible data traffic management is one of the key capabilities the contemporary mobile Operator “must have”. PROTEI DPI platform unlock a variety of the data traffic management tools enabling Operator to deploy range of services related with ultimately flexible traffic charging, bandwidth management etc.

PROTEI DPI is equipped with signature constructor which allows creating new traffic signatures in order to be capable of detecting flows of newly developed Internet applications. Solution is capable of detection of obfuscated protocols using statistical analysis techniques and allows flexible creation of new services and protocols using regularly updated signature base. The platform supports bit rate control with regard to service priority, supports ToS/DSCP traffic prioritization.

To deploy URL-based service delivery policies PROTEI DPI is able to classify the traffic by URL or part of URL using external database (Websense security cloud or other content classification platforms may be supported), local “black” and “white” URL lists.

PROTEI DPI supports Gy (Diameter) per-service realtime charging and periodical per-service quota and also performs subscriber identification using RADIUS, Diameter (Gx), XML. The platform can be integrated with “pull” or “push” subscriber identification databases. System supports different tariff plans which can be applied to a subscriber basing on his identity or command from external source (3GPP PCRF).

PROTEI DPI is horizontally-scalable, carrier class system having redundant architecture with no single point of failure or “bottleneck”. It performs as a software or software-hardware packet (using of 40 Gbit/s boards developed by PROTEI) and can be easily customized.

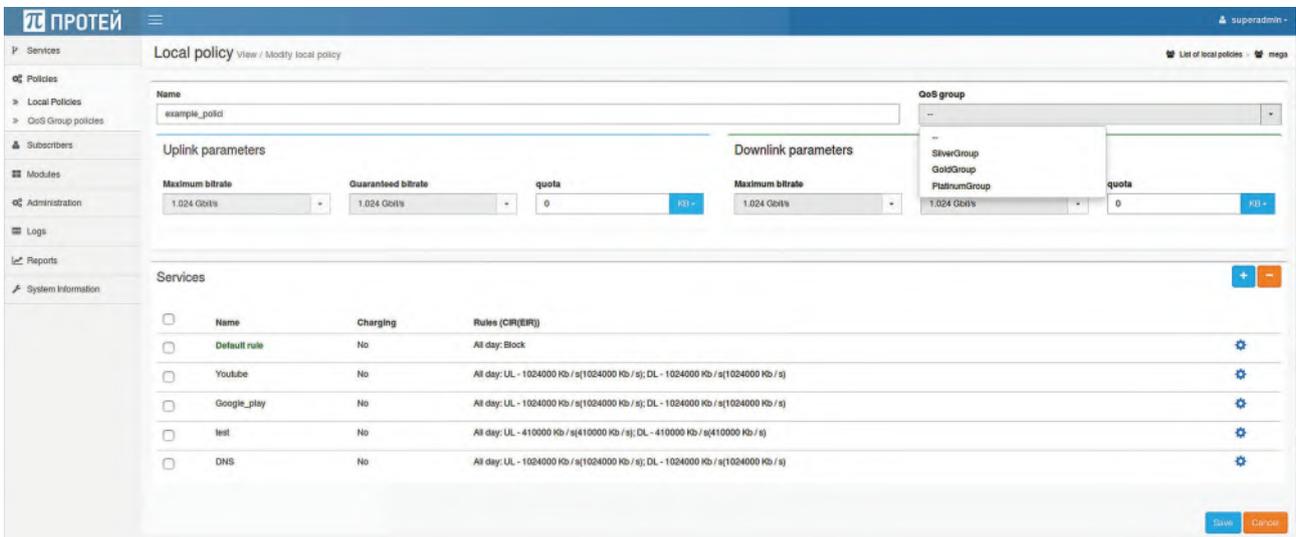
Bill Shock Prevention Platform

‘Bill shocks’-related cases are generating many problems not only for Customers, but also for Operators. Both customers who roam don’t use their mobile devices because they are worried about usage costs, and subscribers who use their data services without regard to costs are source of headache for mobile operators. Customers become angry with Operator for sending them a huge bill, and Operators often cannot collect huge amounts from their subscribers (due to image risks of other reasons) but responsible for wholesale amount to be paid to their roaming partners.

PROTEI Data Usage Control and Billshock Prevention System allows to avoid the customer complaints that follow bill shock by notifying roaming subscribers in real-time about their data traffic consumption and related costs.

This platform enables subscribers to set spending and/or usage thresholds based on pre-established policies. The policies may be configured by subscriber and by Operator as well. System has capability to inform subscribers via SMS upon approaching this threshold and switch service off as soon as consumption limit had been reached.

Solution deployment will help Operators to assist their roaming subscribers to manage data roaming costs, while also helping prevent fraud and abuse of flat-rate data roaming plans.



Policy Controller (PCRF)

PROTEI Policy Controller is an intellectual node regulating policy and charging parameters of mobile broadband subscribers in 3G and LTE networks. Equipped with a flexible and easy-to-manage policy decision engine PROTEI Policy Controller addresses mobile network operator's business need to implement policy and charging rules providing dynamic distribution of limited broadband network resources.

Policy and charging control in modern networks implies dynamic per-service modification of available bandwidth and money debiting rules during ongoing Internet session depending on the type of service, subscriber profile parameters, subscriber historical data, date and time and commands from external systems like subscriber portal. Besides data channel parameters control PROTEI Policy Controller allows to manage content-filtering rules for the subscribers providing parental control or corporate control services.

PROTEI Policy Controller supports the following interfaces:

- Gx-interface towards GGSN, PDN-GW or DPI. This Diameter-based interface is used for policy and charging rules transfer to policy enforcement point (PEP).
- Sp-interface (Diameter or XML) allows to receive subscriber-related information from subscriber profile repository.
- Rx-interface towards external applications which may require a capability to modify the parameters of subscriber's Internet connection. This interface is Diameter-based, XML-based exchange is also supported.
- In 3GPP Release R8+compliant networks PROTEI Policy Controller also supports Gxc-interface, used for policy and charging rules transfer to S-GW, and S9 interface, towards VPCRF in roaming scenarios.



Charging

OCS/M2M Platform for MVNO/MVNE

PROTEI OCS is an on-line charging system, fully-functional automatic accounting, charging and billing solution supporting all functions related with subscriber accounts registration and management, real-time service charging etc. Due to rating engine capabilities system may be efficiently deployed by MVNEs and shared among several MVNOs built on such MVNE.

The basic functions of PROTEI OCS are accounting and charging of all kind of telecom services consumed by prepaid subscribers, subscriber management functions including order processing for subscription and unsubscription for the services, administrative management, and rate plan management with unlimited number of tariff plans. System supports time-based, event-based, volume-based and service-based charging including but not limited to “pay-as-you-go” charging and service bundles.

PROTEI OCS supports such features as inventory functions related to prepaid packets sales support, working with dealers (including convenient API or WEB-interfaces for dealers and/or MVNOs), interacting via RADIUS or Diameter (Gy) with external platforms (like PCEF/DPI, GGSNs, WiFi Service Gateways) for real-time charging of data services, integration with external customer care platforms (Voucher management systems, IVRs).

Subscribers' accounts may be recharged using vouchers, airtime transfer or by credit card payments collected through external systems (payment gateways, terminals, ATMs etc). Convenient APIs for integration with external financial, accounting, CRM and Customer Care software tools makes able to implement fully functional financial module complementing this OCS. Flexible and power statistical reporting and generation tools allow to get comprehensive picture regarding service usage, subscriber activity etc.

PROTEI OSC architecture and features are ideally intended for MVNE needs. Several MVNOs can use the system charging capabilities independently from each within billing system.

A list of operators, providing MVNO services, is defined in the system. Name of the company, currency, notification parameters, free change expiry period and others can be specified for each operator in the system.

For each MVNO-client the following parameters are defined:

- Available services and terms of using;
- USSD commands;
- Subscribers' notification templates;
- Role of XML-Gate accounts;
- Profiles of XML-Gate users;
- Available payment systems for each MVNO and others.

PROTEI OCS/M2M system supports wide range of functions specially tailored to serve M2M devices, such as:

- Managing M2M devices through WEB-portal or via API (integration with external information systems possible);
- Monitoring main device activity parameters (Attach/Detach, active GPRS sessions, other available activities);
- SIM lock functionality (linking the SIM-card to the particular device/IMEI);
- Trigger points and thresholds definition (together with list of actions to be performed upon threshold exceeding);
- Displaying devices on the map using embedded GIS module including location control functionality;
- Flexible email and SMS notification subsystem.

Our customers



Rostelecom



Beeline™



MEGAFON



MTS



Tinkoff



MEGACOM

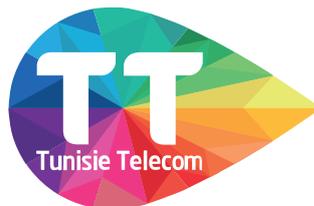


Batelco Group



vodafone





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