

Integrated Public Warning Alert System



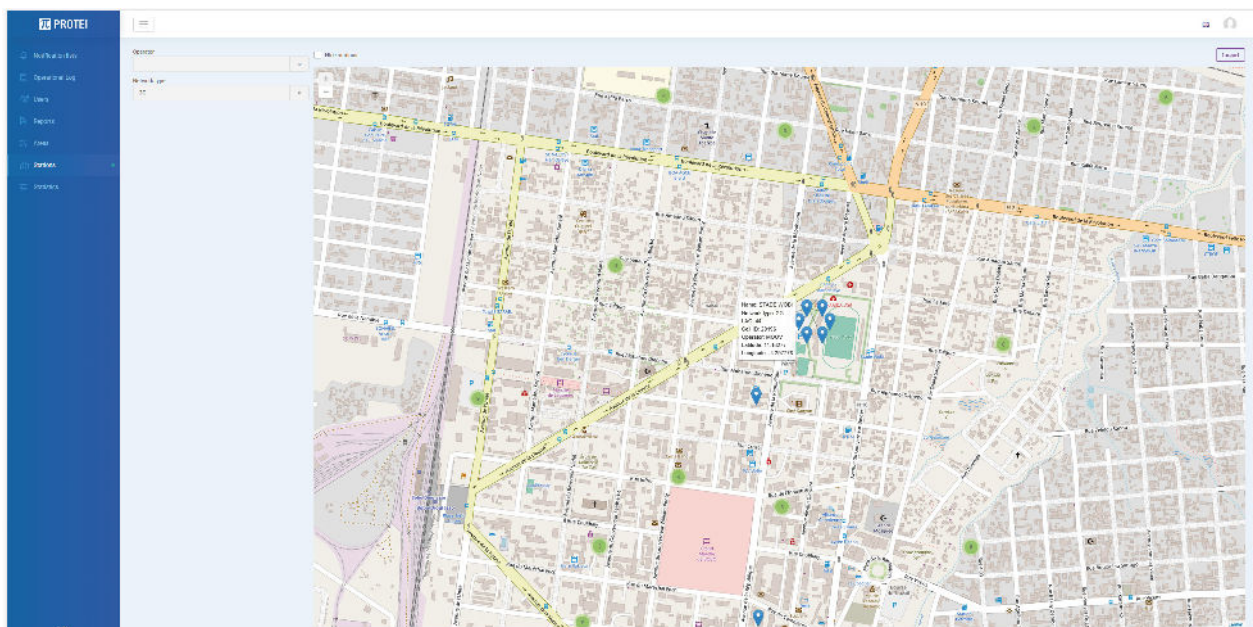
Integrated Public Warning Alert System

In an age of increasing climate instability, technological risks, pandemics, and local hostilities, a government's capacity to effectively protect its citizens becomes a measure of its competence. Traditional communication channels, such as TV, radio, and even SMS, do not fully meet current needs. They are vulnerable, slow, and do not ensure complete coverage. It is time to implement reliable, efficient, and standardized IT technologies.

The combination of Cell Broadcast technology for instant mass alerts via mobile networks and an outdoor warning system, when properly deployed, will provide extensive territorial coverage and ensure the shortest alert time with maximum population reach in disaster areas.

The implementation of an Integrated Public Warning Alert System allows for the resolution of the following key state tasks:

- **Strengthening State Institutions:** A national warning system boosts sustainable development, public trust, and creates modern infrastructure that attracts investment.
- **Bridging the Digital Divide:** Cell Broadcast works on all mobile networks (2G, 3G, 4G, and 5G) and phones, even in remote or low-income areas with poor internet. No setup or subscription is needed.
- **Extensive Population Coverage:** Loudspeaker systems use basic mobile networks for communication between the control center and remote loudspeakers (translation of alerts, administration, monitoring), enabling wide, low-cost deployment without relying on fiber optics.
- **Energy Independence:** Each speaker unit has a backup battery and surge protection, ensuring operation and network connection remain stable even during power outages.
- **Tailoring to Regional Threats:** The system uses a variety of message types (Message IDs) that can be legally defined for specific local threats (earthquakes, floods, etc.), ensuring communities receive relevant crisis alerts.
- **Seamless integration with solutions from leading global vendors of mobile infrastructure.**



Key Benefits

Flexible solution localization:

- English/French UI and technical documentation for local teams;
- Sirens equipped with a 3G/4G cellular router to enable deployment where fixed links are unavailable; also suitable for on-site public-alerting over private LTE (pLTE).
- Controllers of sirens are adapted to extreme heat and guaranteed regular operation.

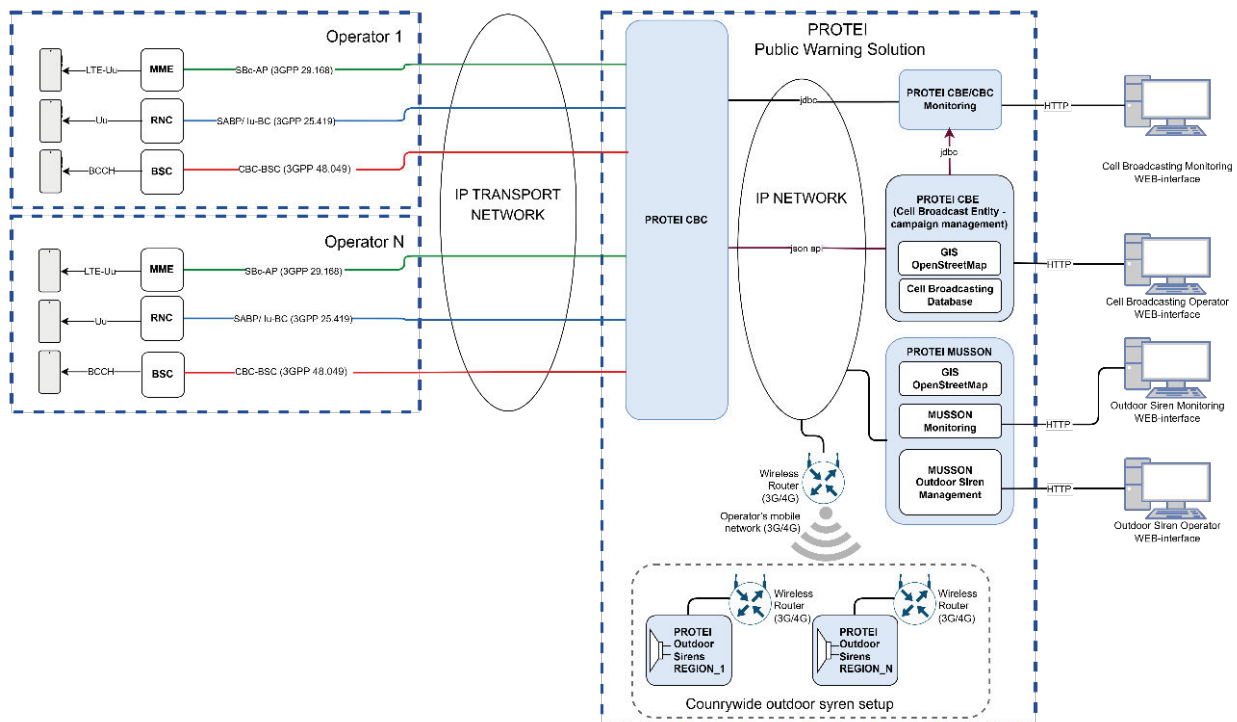
Unification and easy scalability of PROTEI solution

- Capability to scale public alert systems from macro-regional to national-wide level;
- Support for simultaneous alerting through multiple carrier networks to ensure redundancy and reach;
- Unified interface for notifications across all domains (2G/3G/4G and 5G);
- Global open-source solution for geospatial data foundation (OpenStreetMap);
- Redundant virtualized architecture;
- Integration of sensors into the warning infrastructure (enhanced monitoring capabilities for territories and facilities);
- Role-based access control model with personnel action logging for security assurance;
- Capability for integration with external systems via software APIs;
- Universal alert platform supporting various communication channels (SMS, telephone calls, information panels, etc.).

Solution components

PROTEI can provide both the turn-key solution or any of its components, such as:

- Cell Broadcast platform
- Outdoor public warning alert system



Cell Broadcast Platform

Technology Overview

Cell Broadcast (CB) is a method of simultaneously sending short messages to multiple mobile phone users in a defined area. It is defined by the ETSI's GSM committee and 3GPP and is part of the 2G, 3G, 4G and 5G standards. It is also known as Short Message Service-Cell Broadcast (SMS-CB or CB SMS).

Unlike Short Message Service-Point to Point (SMS-PP), Cell Broadcast is a one-to-many geo-targeted and geo-fenced messaging service. Cell Broadcast technology is widely used for public warning systems.

The main advantage of the technology is minimizing of signaling load both on radio interface and on the interface between CBC and core/RAN network elements.

Cell Broadcast Benefits for Public Warning Alert Authorities

- Cell Broadcast message can be delivered to anywhere from a few recipients to millions in under 10 seconds.
- Only authorized agencies and the serving mobile network are permitted to send Cell Broadcast messages.
- Unlike SMS, Cell Broadcast is highly resistant to spoofing.
- Cell Broadcast supports geotargeting: only devices connected to base station (BS) within the targeted area will receive the message.
- Cell Broadcast supports updating existing alerts within a few seconds as a hazardous situation evolves.
- Most terminals now fully support Cell Broadcast (CB) technology, thanks to international recognition and standardization achieved over the past decade.

Cell Broadcast Benefits for subscribers

- Nearly all contemporary smartphones support Cell Broadcast functionality.
- Cell Broadcast uses a dedicated alert tone and vibration pattern that override silent and Do Not Disturb settings.
- URLs, phone numbers, and web links may be embedded directly within Cell Broadcast messages.
- Cell Broadcast supports multiple languages for its alerts.

Cell Broadcast Benefits for Mobile Operators

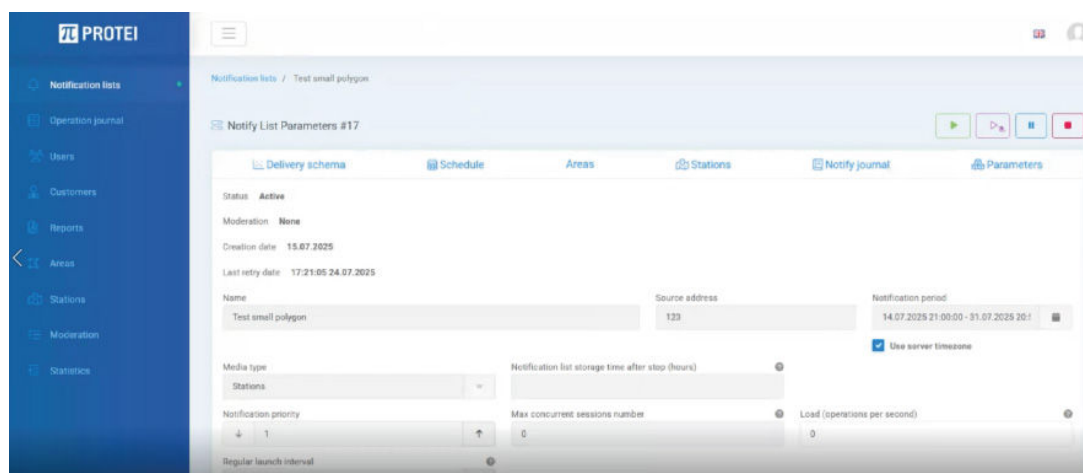
- Cell Broadcast messages do not contribute to network overloads, nor are they impacted by existing network congestion.
- Cell Broadcast can reach roaming subscribers without connecting to their home PLMNs.
- Unlike other messaging services, Cell Broadcast remains unaffected by access class barring and SIM card barring mechanisms implemented within mobile networks.
- Since no subscriber-specific information, such as IMSI or MSISDN, is utilized during transmission, Cell Broadcast fully complies with regulations regarding personal data usage.

PROTEI Cell Broadcast Center (CBC)

PROTEI CBC system provides the means to perform broadcasting of warning message in support of the Public Warning System (PWS) which include Commercial Mobile Warning System (CMAS) and Earthquake and Tsunami (ETWS) messages.

PROTEI CBC is flexible and powerful CB center that provides:

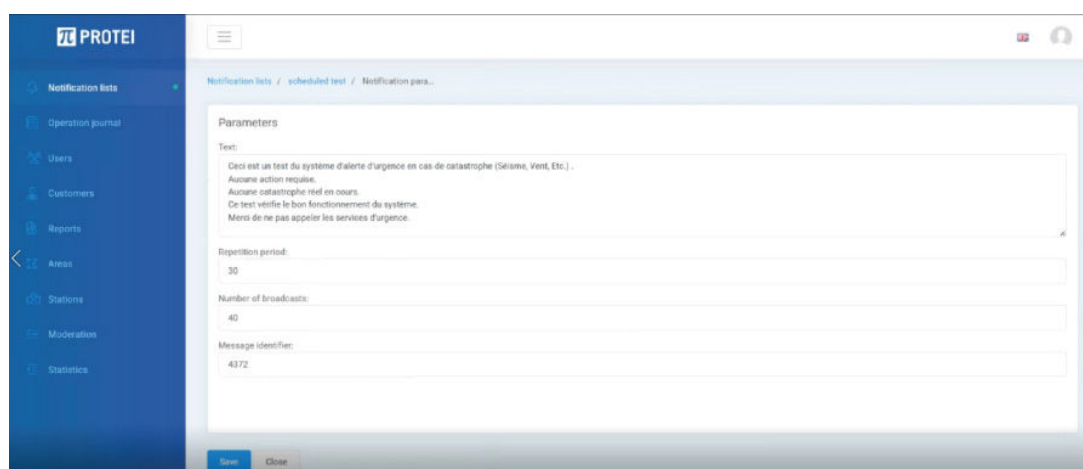
- universal platform supporting CB technology in 2G...5G networks
- transmission (broadcasting) of alphanumeric or binary CB-messages format to subscribers in specified zone via pre-configured CB-channels;
- support of repetition period;
- support of different languages and CB encoding rules
- flexible broadcasting management: allocating certain areas or cells of broadcasting to specific external applications, broadcasting within the limits of one cell, a group of cells, all cells of an assigned BSC/RNC, all cells of an assigned LAC area;
- broadcasting of CB-messages in accordance with parameters (period and repetition rate of broadcasting, priority, message encoding format), which are set by service providers;
- interaction with multiple external applications (providers) via API.



PROTEI Cell Broadcast Management Entity (CBE)

PROTEI Cell Broadcast Management Entity (CBE) is a subsystem responsible for broadcast management and geo zones definitions. Using the very convenient WEB interface, the system administrator is able to:

- CB Message distribution list management;
- CB Message request generation and forwarding;
- Role-Based Access Control (RBAC);
- Geographical targeting (GIS-based);
- Embedded powerful logging and CDR subsystem;
- Advanced scheduling logic of broadcasts;
- Multi-language Web-interface support.



PROTEI Outdoor Alert Platform

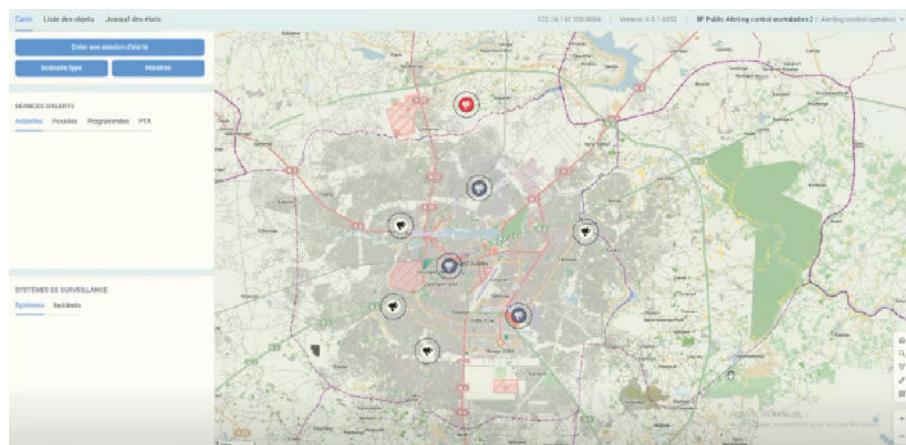
The Outdoor Alert Platform is designed to manage a geographically distributed complex of public address (street alert) systems.

Key Benefits

- Advanced logic for creating alert schedules.
- Role-based access control and logging.
- Three-language Web-interface support and documentation.
- Rapid deployment capability, taking into account existing infrastructure.
- Ability to use various communication channels: wireless, digital, analog, IP.
- Capability to build a hierarchical alert system (Country-Region).
- Integration with monitoring systems (fire sensors, air pollution sensors, etc.).

Outdoor Alert Platform comprises both core and optional components. Core components include:

- Regional hardware-software module;
- Web-interface for Outdoor Alert Platform;
- Outdoor Alert equipment set consisting of a controller and a group of loudspeakers.

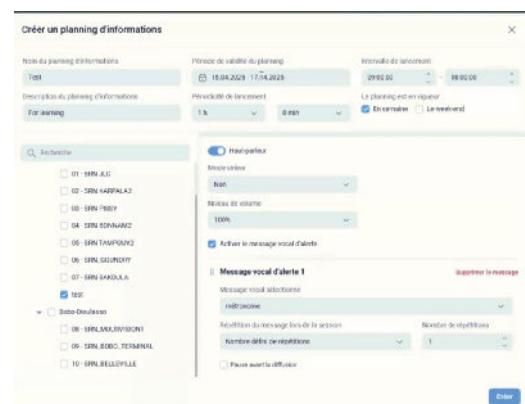
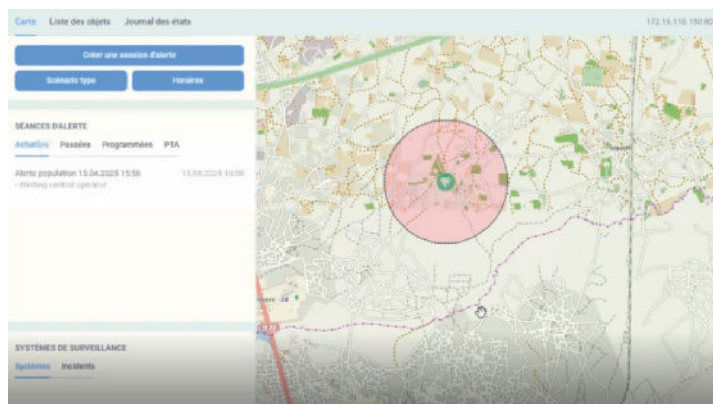


Optional components include:

- Dispatcher hardware-software module.
- Integration Gateway for alert third-party equipment or sensors integration.

A user-friendly WEB-interface for the outdoor alert subsystem operator ensures:

- Notification management (creation, editing, activation/deactivation, archiving);
- Visualization of outdoor alert systems on a geographic map, indicating the audible range of the alert;
- Binding of notifications to predefined geographical zones;
- Role-based access control;
- Maintenance of alert execution logs and personnel activity logging;
- Monitoring of outdoor alert system status with mapping to a geographic map.



Company Profile

PROTEI is an international telecommunication systems vendor operating in, Eastern Europe, Central Asia, Latin America, the Middle East and North Africa, having extensive know-how and a proven track record in the telecommunication market from 2002.

Under PROTEI brand we present reliable, cost effective, carrier-class solutions. Using the latest convergent technologies implemented in our products the most innovative services can be delivered with maximum efficiency.

PROTEI offers comprehensive solutions for building 3G, 4G/LTE, MVNO, Private LTE/5G, NGN/IMS network infrastructure and Smart/Safe City solutions including Public Alert Systems.

Our products are highly customizable and can be tailored to meet any requirement. PROTEI solutions help operators and state institutions maintain customer loyalty, increase revenue, and enhance security levels.

What makes PROTEI solutions special?

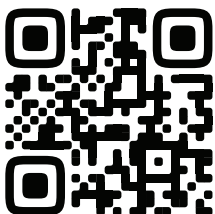
PROTEI specializes in creating solutions that take full advantage of the most advanced technologies available, designed in-house with strict quality control (ISO 9001:2008 and ISO 14001:2004), rigorous testing for stability and reliability and, of course, maximum compatibility with all our existing product range.

You benefit from our meticulous attention to detail, dedicated pre-sales and after-sales service and our commitment to providing the best possible equipment.

When designing and developing solutions, we look at 'the bigger picture' – making all our systems compatible with each other as well as with third-party equipment plus maximizing flexibility and scalability.

Why Deal with PROTEI?

- 23 Years of expertise in the area
- Over 50 systems and solutions for mobile operators of GSM / UMTS and LTE standards, including all key elements of the network core
- Several commercially operated Full MVNOs and tens of DPI deployments in different countries
- Great experience in developing and deployment Safe City platforms in more than 50 cities/provinces in a few countries
- Successfully implemented projects in 45 countries
- Compatibility with the core equipment of leading telecom vendors



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