

Dispatching communication system for the ČEZ Company, Czech Republic

Short description

The project designs a specialized communication system for dispatching management of service teams. The described solution creates a unique and flexible system designed for the whole operated region, distributed into several areas. The system provides high level of reliability and easy operation for all users.

Dispatching control within the serviced region is distributed into regional centers. It consists of several service stations areas and field teams. Every team member can use both fixed and radio network for common communications with dispatchers and with other users.

1. System architecture

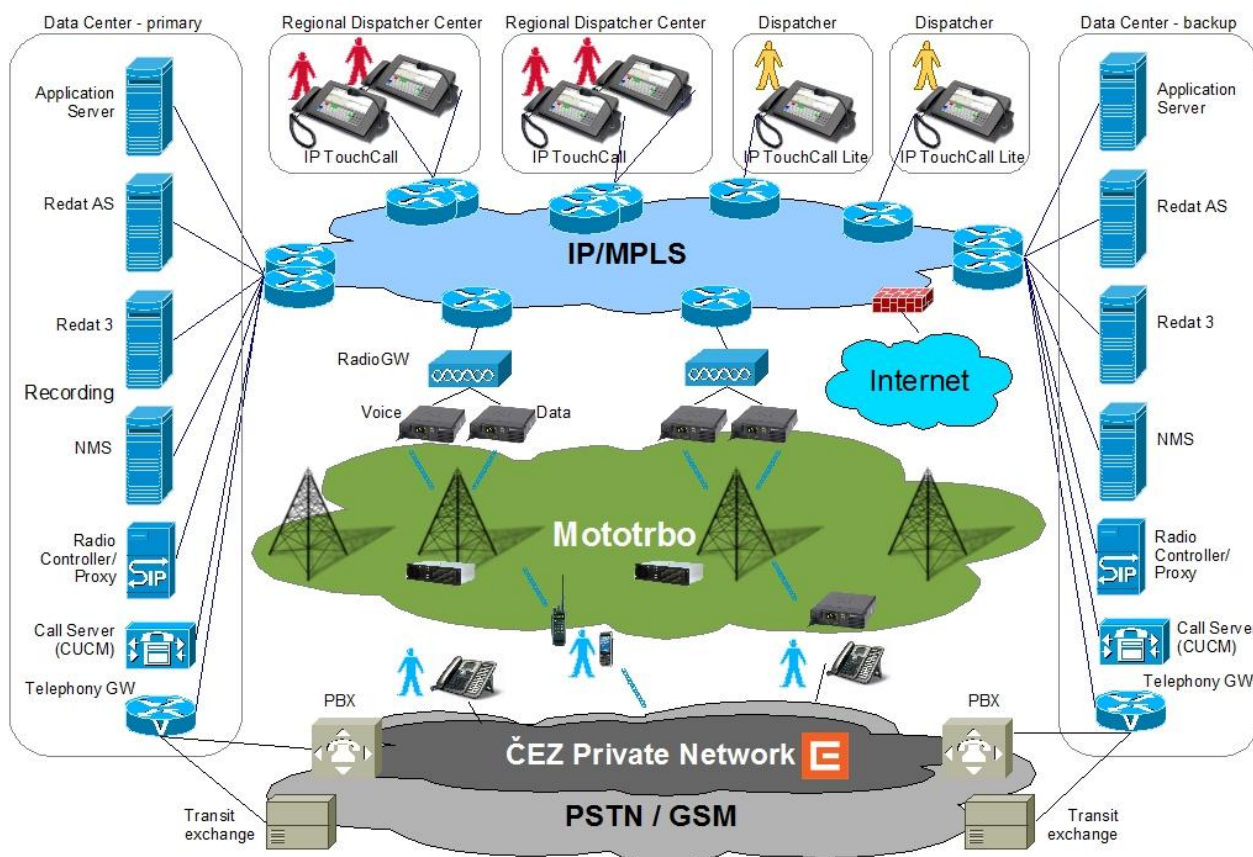


Fig. 1 System architecture

The dispatching system consists of:

- field team member's mobile radio terminals
- regional dispatching workplaces equipped with desktop dispatching terminals IP TouchCall™
- workplaces of service managers and workflow specialists, equipped with a Lite version of IP TouchCall™ terminals which provide modified functions
- access radio communication network based on the radio system Motorola Mototrbo, connected to the terrestrial infrastructure via special gateways (RadioGW)
- two mutually back-upped data centers

Terrestrial communication system, which connects fixed terminals, data centers and gateways into the radio networks, is based on the IP data network build on the MPLS infrastructure.

1.1 Dispatching workplaces

Workplaces for dispatchers shall provide voice connection with radio terminals, service team managers and private lines within the company communication network, including the interconnection to the PSTN/GSM networks. Each workplace supports handling of several simultaneous calls. Interconnection with the radio stations is half-duplex.

The workstation is based on the SW terminal IP TouchCall™, designed as a PC with touch-screen and voice equipment components (micro telephone, microphone, Intercom). The touch-screen offers basic control elements – “keys”. These programmed elements provide direct dialing of necessary phone numbers – heads of teams and members of service teams (functional numbers), emergency services and other important contact numbers in the region. Status of the connection (incl. radio connection) is indicated by the color of the key. The touch-screen interface contains further information: for example lists of carried and missed calls. Information is structured into variable overlapped windows, which represent the organizational structure of attended service stations.

In addition to above mentioned functions, further complementary services for dispatchers are available:

- choice of dispatching areas, handled by the dispatcher
- opportunity to replay records of own voice communication

The terminal of the dispatch manager displays an overview of the allocation of several areas to the competent dispatchers. It maintains dispatching accounts administration and allows replaying records of the voice communication executed by all subordinated dispatchers.

1.2 Further components of communication infrastructure

The basic system elements are situated in data centers. These are:

- control block of IP telephony (Call-Server)
- Radio Proxy server maintaining registration of mobile terminals and storing information about their accessibility
- Application Server which stores and transmits the entire system configuration
- ReDat3 system for dispatching voice communication record and replay (Record Unit and Application Server)
- management system for monitoring of terminals, RadioGW, servers and possibly IP/MPLS infrastructure as well, implemented on the SNMP environment

The main parts of the infrastructure (Call-Server, Radio proxy, Application Server and Record Units) are back-upped in 1+1 configuration with geographical diversity.

Dispatching terminal IP TouchCall™ standby is ensured by a spare terminal in each regional center.

1.3 Radio communication system – Motorola Mototrbo

A digital radio system was implemented for mobile access to field servicemen of service teams. The Motorola Mototrbo system consists of repeaters, mobile radio terminals and vehicle radio terminals. Solution is optimized from the point of view of the coverage, space lease fees as well as radio spectrum utilization fees.

RadioGW between radio network and fixed infrastructure is composed of a configuration of the gateway software running on an industrial PC and two base radio stations. The first one is used for data transmission; the second one transmits voice calls. Both of them are working in the in the same frequency channel.

2. System functions

2.1 Types of calls

Dispatching communication system should primarily afford voice connection to dispatchers, service workmen and other telephone subscribers within private and public communication networks:

- calls into internal and external telephone networks
- calls from dispatching center or from outage service station to field radio terminals – private or group
- calls from radio terminal to dispatcher – private
- calls from radio terminal to dispatcher – group
- calls between radio terminals within the single repeater's area - group, individual or direct communication between radio terminals
- emergency calls of dispatchers, routed to the public network independent on physical location of dispatchers - according to the serviced region - over transit branch exchanges.

Each radio terminal has a unique phone number, which allows to tell apart applicability to a given service group and to distinguish a terminal build in to vehicle from a handheld terminal. The dispatcher terminal shows conditions of radio terminals served by the dispatcher - active (accessible to any repeater), occupied, etc. The condition is located over automatic registering of the radio terminals on RadioProxy.

2.2 Administration of dispatching management process

Administration functions of the system on miscellaneous levels (managing dispatcher, authorized dispatcher, head of service team, system administrator) comprise:

- directory editing
 - monitoring of assigned areas
 - administration of dispatching accounts
 - attendance planning
 - key settings of radio terminals
 - changeover of system administration order, i.e. area administration, terminal allocations, alternations in service groups structure, etc.
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