

IP-Communication System for a Passenger Information System - Out now with High Availability concept



The Wenzel IP-communication system now offers a concept for high availability solutions. Here, the Wenzel-MACS HA-VoIP-server (HA = High Availability, VoIP = Voice over IP) is used. It serves as a platform for the establishment of VoIP connections, the management of configuration and firmware, and the SNMP fault management.

In order to ensure clean operation of all server functions in case of failure, the Wenzel-MACS HA-VoIP-server has two servers:

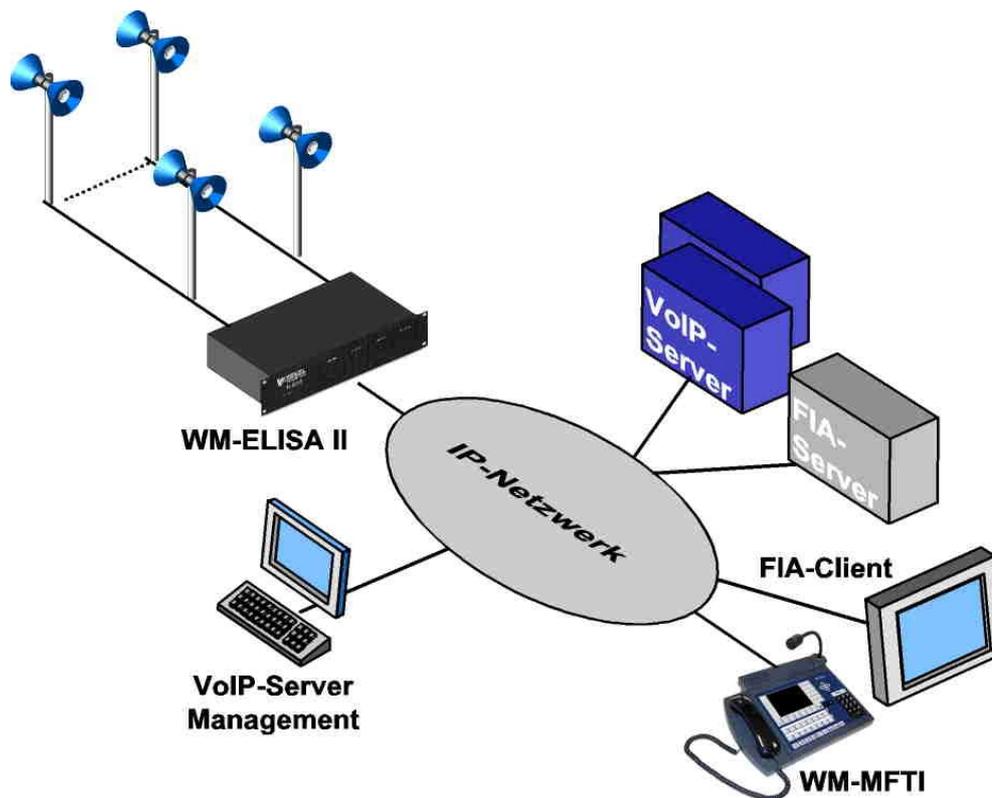
- In case of failure there is an automatic switchover from the active server to the passive one. This server takes over all functions of the active server. Automatic changeover takes place within a very short time and without any apparent failure for the operator.
- All productive data of the active server are automatically mirrored to a second server.
- In addition, the data is stored redundantly in each server on multiple hard disks using software RAID to continue to be available when a disk fails.

This project report is an example of a customized solution, where a communication system using Voice over IP (VoIP) was built as part of a passenger information system (FIA). The FIA structure was part of an operation and information system. The aim of this project is to provide passengers with current and comprehensive information about the train running and variations. The project was realised in close cooperation with DB Station&Service to ensure compatibility with their specifications.

Wenzel Elektronik awarded the contract to build an IP communication system, that allows public address including telephony for all 165 stations of the S-Bahn. The construction was carried out in several sections.

Basically the IP based PA system comprises the following components:

- VoIP-Server (redundancy-backed)
- Management workstation for VoIP server
- Operator unit Wenzel-MACS-MFTI (WM-MFTI)
- PA system WM-ELISA II including integrated announcement device



Due to the use of standard IP transmission, both affordable network components can be used and low transmission costs can be achieved. Here, the use of multicast protocols provides a bandwidth-optimised transmission during group announcements.

The Wenzel IP based PA system meets the requirements of the Deutsche Bahn AG according to equipment level I and has received the EBA type approval.



The system allows both, manual and automated announcements that are initiated by the connected FIA system via the IP network. The signalling during assembly and disassembly of a connection between communication partners occurs using standard SIP/RTP/RTCP protocols. This allows a simple integration of devices compliant to standards (VoIP phones). Manual announcements can be blocked in accordance with the priority matrix and local engaged status if necessary, or can replace an existing announcement. All automated announcements are monitored on the operator unit WM-MFTI.

Group announcements occur using bandwidth-efficient multicast protocols (IGMP). During a dial-up of a multicast announcement, the acoustic source (WM-MFTI) will receive a dial-up receipt, only if all speaker lines of the involved PA systems are interconnected.

The stations are equipped with the PA system WM-ELISA II. The system is a compact 19" module with two height units, including all necessary components. Due to its modular design, the very different requirements are covered. Depending on the number of speaker circuits and concurrent announcements, a WM-ELISA II system can be expanded up to four 100 watts or two 250 watts digital Class-D amplifiers and can be equipped with relays for connecting up to eight speaker circuits. According to the equipment level requirements, it is possible to configure the amplifiers as spare amplifiers.

An automatic announcement function with SES/XML interface for modular announcements is integrated in the WM-ELISA II system. The local storage of announcement messages ensures best use of bandwidth. WM-ELISA II generates the signalling for the automated announcements, evaluates potential messages in case of busy lines, and sets to be repeated announcements (e.g., unsuccessful, partially unsuccessful or periodic) automatically again. Furthermore, legacy intercom stations can be connected locally in order to provide a seamless migration to VoIP during construction of the IP based PA system. Legacy conventional telecommunication systems are connected via an H.323 - SIP - ISDN Gateway, which is equipped with an S0 interface with DSS1 signalling.

All configuration data is stored in a central database, which authenticates all connected devices to access, if configuration parameters, firmware, or announcement messages are to be loaded or updated. The central data storage allows for a quick and easy device replacement in case of servicing. This leads to significant cost savings during installation, maintenance and operation of the system.

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