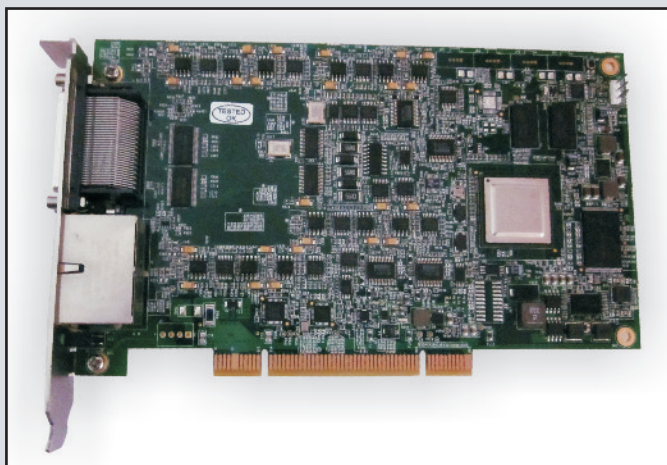# MISTRAL®
... Partners in Real Time

VoIP Radio Gateway

Introduction

Communication gateways permit seamless convergence between IP network, IP dispatchers, SIP terminals or SIP phones and the existent radio networks UHF/VHF, GSM, CDMA and other digital radio base stations. IP Radio Gateways are dedicated equipment for Mission Critical Applications including Public Safety, Transportation, Maritime, Defense or Air Traffic Control.

This case study showcases Mistral's capability in designing a flexible and easy to upgrade VoIP Radio Gateway solution, interoperable with all types of radio communications including conventional radios, TETRA and TETRAPOL terminals. This IP Radio Gateway solution is an exclusive and protected design for Mistral's European customer, Amper.

" Flexible and easy to upgrade VoIP Radio Gateway solution, interoperable with all types of radio communications. "

The Customer

Amper is a leading European player in defense, telecommunication and homeland security and carries out engineering projects, integration and maintenance of communications networks, unified communications and collaboration, next-generation networks, border protection systems, emergency management systems and critical infrastructure protection on a global scale.

The Requirement

The existing EMS system being used by Amper was designed for emergency and communications management. It is modular and scalable, specially directed to make communication, control & dispatch easier for the control room operators in emergency situations. The system allowed communication between speakers using different and incompatible communication systems (conventional radio, analogue and digital radio trunking, fixed and mobile telephony, public address, etc).
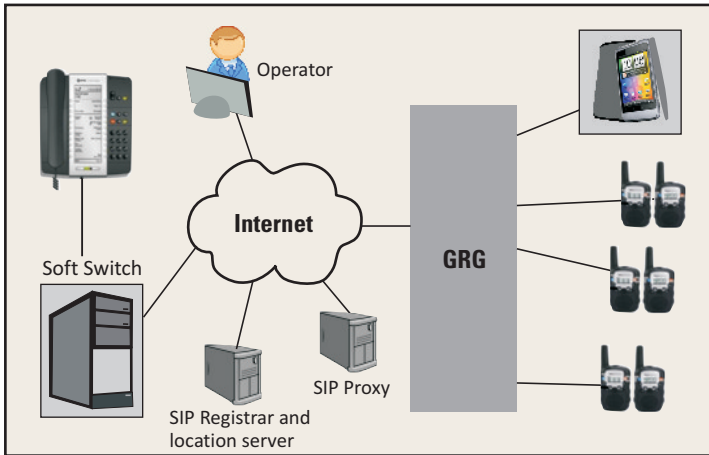
Amper approached Mistral to develop a new radio gateway platform to integrate radio interfaces into the SIP world. The new device needed to be a standard PCB which could be used with different kinds of radio (VHF, UHF, TETRA, TETRAPOL, etc.) by making the corresponding software adjustments over it (configuration settings).

Solution Provided

Mistral provided a solution integrating various line, interface and mixer cards for the system based on TI's DM8148. The hardware consisted of a number of analog radio interfaces to support the different kinds of radios required by Amper.

The team also worked on protocol implementation, integration audio codecs and a SIP client for making VoIP calls. The solution included implementation of SNMP and also provided a web interface with configuration support. Key features of the system are provided below:

▶ Hardware
- TI DM8148 based solution
- 10/100 Ethernet interface

- Software
  - SIP based VoIP solution
  - G.711 codec
  - SNMP based status monitoring
  - Support for PMR radio, analog trunking radio, digital trunking radio etc.
  - Web interface with configuration support.

The Challenges

- Integration of various radio protocols into the radio gateway software
- This was one of the first products developed using SYS/BIOS and since SYS/BIOS was newly released to market, there were lots of integration issues.

Key Achievement

- First SYS/BIOS based product
- Developed a VoIP framework which can be reused by the customer for similar gateway solutions
- More than 75K lines of C-code developed within short span of time
- More than 3000 test cases used for product validation
- The radio gateway designed provided interoperability between many incompatible radio networks.

Customer Benefits

- Customer got a small-footprint, power optimized solution
- The entire system comprised of a compact unit, integrating interface and conferencing into a single device, saving on BoM and production cost for the customer
- Mistral offered an end-to-end solution to the customer covering both the hardware and software aspects of the project, helping the customer to achieve a quick-turn around with no compromise on quality.

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