Project Achievements

CELTIC
Telecommunication Solutions

Deployable High-capacity Gateway for emergency services

DeHiGate

The Project

The DeHiGate project provides to the public safety and security authorities a complete solution for emergency data services. DeHIGate's prototype of a deployable, high-capacity gateway for emergency services integrates existing wireless technologies (Wi-Fi, WiMAX, 3G) with TETRA/TEDS and complements them with innovative applications for network optimization and self-configuration. The broadband features in combination with PMR voice services satisfy the user demands for remote surveillance, tracking, navigation and safety.

Main focus

The DeHiGate project makes use of wireless communications in order to improve the efficiency and increase the safety during the emergency response. The key idea is to integrate many available technologies (WiMAX, Wi-Fi, TETRA/TEDS, GPRS) into a single system. The challenge is to select every time the technology that is suited best to the various services.

Easy management of ad-hoc radio networks with deployable gateways is considered to be crucial for such a system. Collection and distribution of network status to concerned roles make it possible to do management that will improve the efficiency of the network.

Approach

The project started working with the requirements for a prototype in parallel with having contact with users. The user aspects were evaluated and, when not in conflict with the technical limits, taken into the requirements with respect to the planned development of the prototype.

Early in the project the existing technology went through a field trial where the performance was measured when used in a different environment. The results revealed limitations and characteristics that had to be taken into account before deciding on the architecture of the prototype.

The separate contributions to the prototype development were distributed among the consortium partners. Developed software was distributed and tested separately by each partner. The Celtic Event in

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Partners:

Applica AS, Norway

Helsinki University of Technology, Finland

Iber X, Spain

EADS Secure Networks, Finland

Suomen Erillisverkot (SEV) Ltd., Finland

Telefónica I+D, Spain

Thales Norway AS, Norway

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Project Website

www.celtic-initiative.org/projects/dehigate

Helsinki brought forward the chance to perform the first real integration test.

The complete prototype was tested for the first time as a part of preparations before the final field trial in Kuopio, Finland, on 18 April 2008.

Achieved results

The project has resulted in a set of prototype modules made up by functionality realized in software or hardware items with specially developed software.

The core of the prototype concept is the gateway itself. The hardware is based on the modular PC-104 standard installed in a rugged construction box equipped with connectors in accordance with military standard. The gateway can interface a wide specter of wide area network infrastructure.

The gateway software implements multi-topology routing and auto configuration of IP tunnels between different gateways reporting to the same home base.

The developed network management software runs on ordinary laptops and keeps an updated view of the network elements, their position and status and quality of connected transmission links. It also tracks the nodes in the deployed ad-hoc network. This complete status information is displayed on a map application based on Google Earth functionality.

To make the ad-hoc network more robust, a set of rugged construction ad hoc relay nodes that may easily be carried and deployed are developed. The improved robustness is achieved by positioning the relay nodes in the terrain, in order to create a mesh structure in the ad-hoc network. Each node runs on battery and is equipped with a GPS receiver for position information.

To help emergency people enter unknown terrain and buildings, downloading maps is considered useful. The project has developed a bandwidth-measuring function that adjusts the size, and thereby quality, of the download to the available bandwidth. The University partners have contributed through measurements and studies on ad hoc networks, and simulation of impact of new cost metric algorithms.

The project has not filed any patents, but have influenced standardization work on Tetra/TEDS. Further development of the prototypes into potential commercial
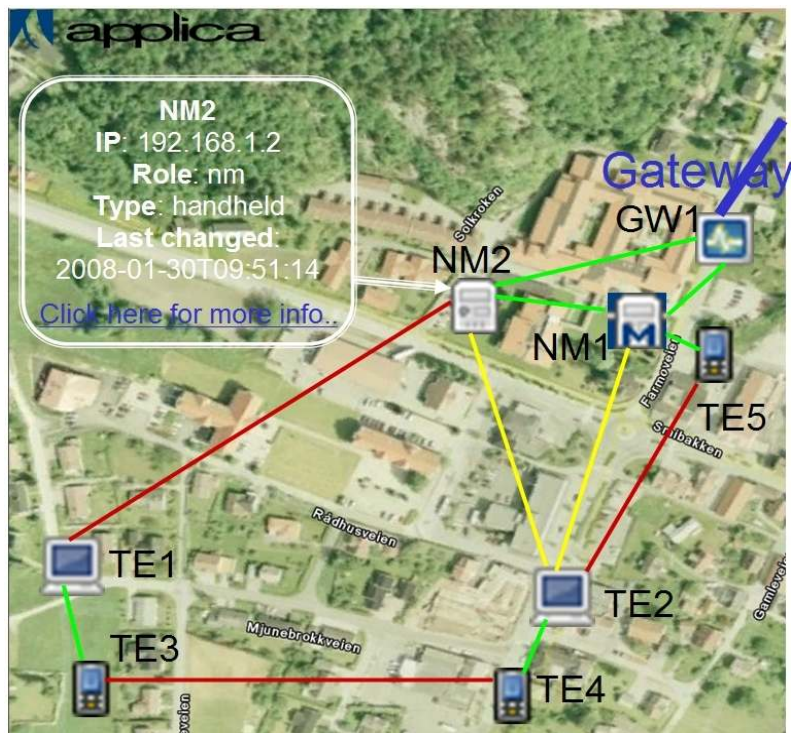
products is currently under evaluation by the industrial partners in the consortium.

Impact

The industrial partners will launch demonstration activities within their own countries in order to get more evaluation and feedback from real users. This will contribute to the improvement and clarification of the requirements and specifications for this type of equipment.

About Celtic

Celtic is a European research and development programme, designed to strengthen Europe's competitiveness in telecommunications through short and medium term collaborative R&D projects. Celtic is currently the only European R&D programme fully dedicated to end-to-end telecommunication solutions.

Timeframe: 8 years, from 2004 to 2011

Clusterbudget: in the range of 1 billion euro, shared between governments and private participants

Participants: small, medium and large companies from telecommunications industry, universities, research institutes, and local authorities from all 35 Eureka countries.

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