CELTIC DeHiGate

Magic box for mission impossible

For rescuers working in remote places working phones and internet are literally a question of life and death. A team of researchers and businesses in Norway, Spain and Finland decided they need to be equipped with a box with the power to connect them to networks wherever they are.

On September 11, firefighters, police officers and ambulance workers faced a terrifying rescue effort in the World Trade Center complex. They battled to save people from the collapsing Twin Towers, searched for survivors, tackled fires and evacuated as many people as they could in an area which contained an estimated 17,000 people. And making their jobs even harder was the problem of poor communications: frightened workers and their relatives jammed mobile networks with calls and the emergency services' own radio communications turned out to be incompatible with one another.

Ever since, emergency workers and public authorities across the world have tried to learn lessons from that unprecedented scene and some telecoms specialists have sought to provide some of the technological answers. In Europe, Norwegian, Finnish and Spanish telecoms specialists and researchers started the CELTIC project DeHiGate to develop a technology that would ensure the ability to use phones and internet even in difficult terrain and difficult circumstances. "Our idea was to make a sophisticated box that you could connect to all kinds of communications centres like satellite and wireless, a box that emergency services could take with them instead of a big satellite dish," says Vidar Karlsen, research and development manager at the Norwegian branch of French electronics firm Thales.

Thales, which initiated the idea, quickly secured interested partners, including university researchers and the Spanish telecoms operator Telefonica. They realised that such technology would also have ready application in many standard emergencies such as accidents on motorways in areas where network coverage is poor. In particular, the researchers wanted to ensure that rescue workers could receive and send each other detailed maps of areas, pictures of a disaster and other graphics and images which might make the rescue quicker or safer. To do that, they needed to ensure emergency workers would have enough bandwidth. Telefonica developed an application to estimate the bandwidth available on a network in order to make a decision on whether to connect to another network.

Karlsen says the box which the team began developing was an advanced router, which used existing hardware and equipment. The challenge was for the team to develop and test new software to make it work the way they wanted. Telefonica developed the best way to use large servers on the move, crucial work to make it easier to roll out networks in remote areas. Its workers explored the analysis of data in real time from geographical information systems.

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DeHiGate hit hurdles, however. Initial partners struggled to secure funding

or pulled out and project progress became sluggish. Developers had to use a mid-term review to get their focus back. They set themselves a deadline to develop a prototype box in time for a two-day emergency simulation in Finland.

"We had a fire and accidents, we had a scenario where we had to bring people out from a burning building," remembers Karlsen. "As a developer you always have an idea of the user's requirements, but when you see the actual requirements you realise you could never think of all that."

Firefighters took part in the simulations and gave their views on the technology. The developers set up emergency ad hoc radio stations to deploy communications and watched as firefighters made calls, used the internet and even passed video footage of the disaster back to their colleagues at the base. "With this you can get reports on digital maps and see where each and every firefighter was," says Karlsen.

Firefighters pointed out aspects of the technology which they would prefer to work differently, pointing out, for instance, that ordinary video cameras might not be good enough quality for areas affected by a lot of smoke and thermal cameras might be needed. However, in general they gave the new box their approval.

Since the project completed last year, Thales has continued to develop the router with a view to commercial contracts. "The direct users of this product might be limited groups – emergency workers – but what this project achieved could affect a broad group of people, whole countries," says Heinz Brueggemann, the director of CELTIC.

The knowledge gained by the partners in DeHiGate about setting up adhoc networks could also be easily transferred to other telecoms markets. Telefonica agrees. "The results and the ideas which came up in this project, both in terms of (network) architecture and applications, have been the foundation for the development of a large project about personalisation, advertising and the use of telephone directory services," said Erik Miguel Fernandez, Project Manager for Research in Information Systems at Telefonica.

A total of 411 rescue workers were among the 2,995 people who died in the September 11 attacks. During the struggle to save lives, much helpful information from 911 callers was not passed to rescuers on the ground because of poor communications. A police warning for emergency workers to evacuate the towers before they collapsed was also not well conveyed. If a system similar to DeHiGate had been in place, perhaps as many emergency worker lives might not have been lost in action. CELTIC found a way to improve the safety of those who put their lives at risk to save others.

> If a system similar to DeHiGate had been in place during the September 11 attacks, perhaps as many emergency worker lives might not have been lost in action.

Project participants:
Finland, Norway, Spain

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