PROJECT

GEONET

Geo-addressing and Geo-routing for Vehicular Communications

Funding: European (7th RTD Framework Programme)

Duration: Feb 2008 - Jan 2010

Status: Complete with results

Total project cost: €2,985,964

EU contribution: €1,899,208

Call for proposal: FP7-ICT-2007-1

CORDIS RCN : 85551

Background & policy context:

To increase the road safety in Europe while traffic and driver's concentration demand also rises, the EC and the automotive industry have committed to halve the loss of life by 2010. The GeoNet project set out to significantly contribute to this goal by implementing a reference implementation of a geographic addressing and routing protocol with support for IPv6 to be used to deliver safety messages between cars but also between cars and the roadside infrastructure within a designated destination area.

While the CAR 2 CAR Communication Consortium has invested significant effort into the specification of a car-to-car communications mechanism suitable for safety applications, its mandate does not extend beyond defining a specification. At the same time, ongoing projects like SafeSpot would need an actual implementation to rely on whereas other such as CVIS are developing a communication architecture relying on the maintenance of a constant access to the Internet over IPv6.

GeoNet set otu to bring the basic results from the work of the CAR 2 CAR Communication Consortium to the next step, by further improving these specifications and creating a baseline software implementation interfacing with IPv6.

Objectives:

The goal of GeoNet was to implement and formally test a networking mechanism as a standalone software module which can be incorporated into Cooperative Systems. This implementation shall enable transparent IP connectivity between a vehicle and the infrastructure, even in cases when delivery must be hopped over several vehicles or cached along the way. GeoNet not only benefited from previous work within these projects, but also provided a support for the integration of its solution. This collaboration was sketched in support letters.

Once GeoNet fulfils the existing implementation gap of geo-addressed networking, ongoing and future projects for Cooperative Systems can maintain their focus on architecture design, application development and field trials.

Methodology:

Concept

From a safety perspective, GeoNet implemented the networking mechanism for reliable and scalable delivery of such information to all vehicles for whom it is relevant. Its facilitation of cooperative awareness enabled safety applications to initiate warning or mitigation actions when required and to identify transaction partners or destination area for dissemination of their messages.

From IP networking perspective, the design goal is to provide vehicular message routing, which is efficient under quickly changing topology, and works without excessive amount of air interface signalling. At the same time already standardised IPv6 NEMO system may perform its task seamlessly, as underlying geographic networking may present the multi-hop vehicular routing part as a virtual single-hop connection between a road-side unit and vehicles in its service area.

Technical objectives

Geographic addressing and routing is a networking mechanism distributing the information to nodes within a designated destination area. A novel routing protocol is in charge of information dissemination over multiple hops until every vehicle has received this information within the destination area. Each vehicle evaluates whether re-transmission is required and executes it with proper timing if needed.

In this concept, individual nodes' addresses are linked to their geographical position which is used by forwarding algorithms to transport data packets towards the destination node ('geographical unicast' or 'geounicast'). Also, geographical positions are used to define a geographical region that can be linked to nodes, either to address all nodes in the region ('geographical broadcast' or 'geocast') or to address anyone of the nodes in the region ('geographical anycast' or 'geoanycast').

Parent Programmes:

FP7-ICT - Information and Communication Technologies

Institute type: Public institution

Institute name: European Commission

Funding type: Public (EU)

Lead Organisation:

Institut National De Recherche En Informatique Et Automatique

Address:
Domaine de Voluceau- Rocquencourt
B.P. 105 LE CHESNAY
France

Organisation Website:
http://www.inria.fr/

EU Contribution: €499,838

Partner Organisations:

Broadbit Hungary Fejleszto Es Tanacsado Kft

Address:
Kolozsvar Utca
Budapest
1028
Hungary

EU Contribution: €256,940

Fundacion Imdea Networks

Address:
Avenida Del Mar Mediterraneo
28918 Leganes (Madrid)
Spain

Organisation Website:
http://www.networks.imdea.org

EU Contribution: €94,260

Association Pour La Recherche Et Le Développement Des Méthodes Et Processus Industriels

Address:
Boulevard Saint Michel 60
75272 Paris

France

Organisation Website:
http://www.armines.net

EU Contribution: €0

Lesswire Gmbh

Address:
Im Technologiepark 1
15236 Frankfurt (Oder)
Germany

EU Contribution: €267,131

Efkon Ag

Address:
Andritzer Reichsstrasse 66
8045 Graz
Austria

EU Contribution: €139,480

Hitachi Air Conditioning Europe Sas

Address:
Rue Grange Dame Rose
78140 Velizy Villacoublay
France

Organisation Website:
http://www.hitachi.eu

EU Contribution: €336,809

Nec Europe Ltd

Address:
Nec House, Victoria Road
London
W3 6BL
United Kingdom

EU Contribution: €304,750

Ecole Nationale Superieure Des Mines De Paris

Address:
BOULEVARD SAINT MICHEL 60
75272 PARIS
France

EU Contribution: €0

Technologies:

Road vehicle operations
Communication network for intelligent mobility

Development phase: Demonstration/prototyping/Pilot Production

Key Results:

Produced a reference GeoNetworking specification for the standardisation within organisations. GeoNet users may use the specification as guidance for performing troubleshooting, if the need for such procedure arises. The final GeoNet specification document has been contributed to the ETSI Intelligent Transport Systems (ITS) standardisation committee.

GeoNet developed two independent implementations (Hitachi+ NEC). The GeoNet partners Hitachi and NEC brought into the GeoNet project a strong background and expertise of earlier developments in the area of GeoNetworking. These partners developed two independent Car to Car (C2C)Net software modules, utility software and corresponding documentation. This is useful for standardisation, but also for exploitation since their characteristics can be compared and a quality competition of implementations is initiated.

Strategy targets

An efficient and integrated mobilty system: Secure Transport

Documents:
GEONET design goals and requirements (Final report)

STRIA Roadmaps:
Cooperative, connected and automated transport, Network and traffic management systems

Transport mode: Road transport

Transport sectors: Passenger transport

Transport policies: Safety/Security, Digitalisation

Geo-spatial type: Other