

Traffic safety applications requirements

draft-karagiannis-traffic-safety-requirements-01

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Motivation

- Vehicular networks are expected to become widely deployed in the near-mid future
 - Mainly motivated by safety and traffic efficiency use cases and applications
 - The so-called “infotainment” and Internet alike applications will also be considered
- Many initiatives going on in the US, Europe and Japan
 - This draft summarizes the safety use cases considered so far and the requirements they pose on the communication networks
 - US: VSC (Vehicle Safety Communications) and VSC-A (VSC-Applications)
 - Europe: C2C-CC (Car-to-Car Communications Consortium) and ETSI TC ITS
- Can these requirements be met by IP based network and transport solutions?

VSC traffic safety applications (same as in -00 version)

- Traffic signal violation warning
- Curve speed warning
- Emergency Electronic Brake Lights
- Pre-crash sensing
- Cooperative Forward Collision Warning
- Left Turn Assistant
- Lane Change Warning
- Stop Sign Movement Assistance

- VSC-A are quite similar (described in the draft)

C2C-CC traffic safety applications (added in -01 version)

- Cooperative Forward Collision Warning
- Pre-Crash sensing
- Hazardous location notification

Traffic safety application requirements

(from VSC project results)

(same as in -00 version)

Network constraints	
Constraint type	Constraint value.
Aggregate bandwidth	6 Mb/s
Maximum received packets/sec	4000
Maximum allowable latency	100 ms
Maximum network latency	10 ms
Maximum packet size	200 bytes

Traffic safety application requirements

(from C2C-CC results and ETSI (ETSITR102638) specification)

	Commun. Type	.Trans. Mode	Min. Freq. (Hz)	Latency (msec)	Data to be transmitted and/or received	Max. Req'd comm. range (m)
Cooperative Forward Collision warning	* vehicle-to-vehicle * Broadcast * Geocast	Periodic	~10	~100	* Position * Velocity * Acceleration * Heading * Yaw rate	20 to 200
Pre-Crash Sensing	* vehicle-to-vehicle * Unicast *	Periodic	~10	~100	* Vehicle type * Position * Velocity * Acceleration * Heading * Yaw rate	20 to 100
Hazardous location notification	* vehicle-to-vehicle * Broadcast * Geocast *	Time limited Periodic	~10		* events and characteristics * of road	300 to 20000

Discussion (I)

- the traffic safety applications and use cases derived by European and USA projects and consortia are quite identical;
- the performance requirements derived by European and USA projects and consortia are similar, but:
 - main difference is that European derived traffic safety applications consider multi-hop communication, i.e., geocasting forwarding, while USA derived ones use only single hop broadcast solutions

Discussion (II)

- Could these new traffic safety communication (performance and functional) requirements be supported by IP network and IP transport based solutions that will be standardized by the IETF?

Next steps

- Do you think it is interesting to continue working on this?
 - an informational document that describes which are the requirements brought by safety and traffic efficiency vehicular use cases and evaluates whether an IP based architecture would be able to meet them (identifying open issues that could potentially need IETF work)?