



## ***IPv6 and the vehicle of the future: The CVIS & GeoNet EU projects***

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# The vehicle of the future: Why not IPv4 ?

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- ◆ Vehicles are connected to the Internet
  - => Several IP addresses per vehicle**
    - ◆ On-board units (**OBU / Router**) maintaining **Internet access** through **several** medias (3G, 802.11p, ...)
    - ◆ Application Units (**AU / Host**) running **ITS applications**
    - ◆ Hand-held devices running **multimedia applications**
    - ◆ OEM: Gateway between IP and CAN
- ◆ Number of cars worldwide
  - ◆ 1997: 600 millions
  - ◆ 2030: 1200 millions (at present trend)
- ◆ IPv4 is a non-go for ITS deployment
  - ◆  $2^{32} = 4,294,967,296$  addresses
  - ◆ Too many vehicles for NAT
  - ◆ Limited mechanisms for IP session continuity (**NEMO**, mobile edge multihoming, etc.)

# The vehicle of the future: Why should we care about IPv6 ?

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- ◆ IPv6 **not an option** for wide development of IP-based ITS applications
  - ◆ IPv6 is currently being deployed (not an utopia) and will be fully operational by the time ITS systems get deployed
- ◆ Urgent to develop **IPv6 awareness and know-how** within the ITS community
  - ◆ Avoid disruption of business due to bad design and lack of vision
  - ◆ Considering IPv6 at the earlier design stage will further ease the transition from IPv4 to IPv6 and save costs
  - ◆ IPv6 compatibility must be ensured now

# The vehicle of the future: CVIS and GeoNet EU Projects

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- ◆ **CVIS (FP6)**

- ◆ <http://www.cvisproject.org>

- ◆ IPv6 communications between cars & central systems

- ◆ Communication architecture inspired from CALM

- ◆ CALM:

- ◆ **ISO TC204 WG16**

- ◆ **Communication Architecture for Land Mobile**

- ◆ <http://www.calm.hu>

- ◆ **GeoNet (FP7)**

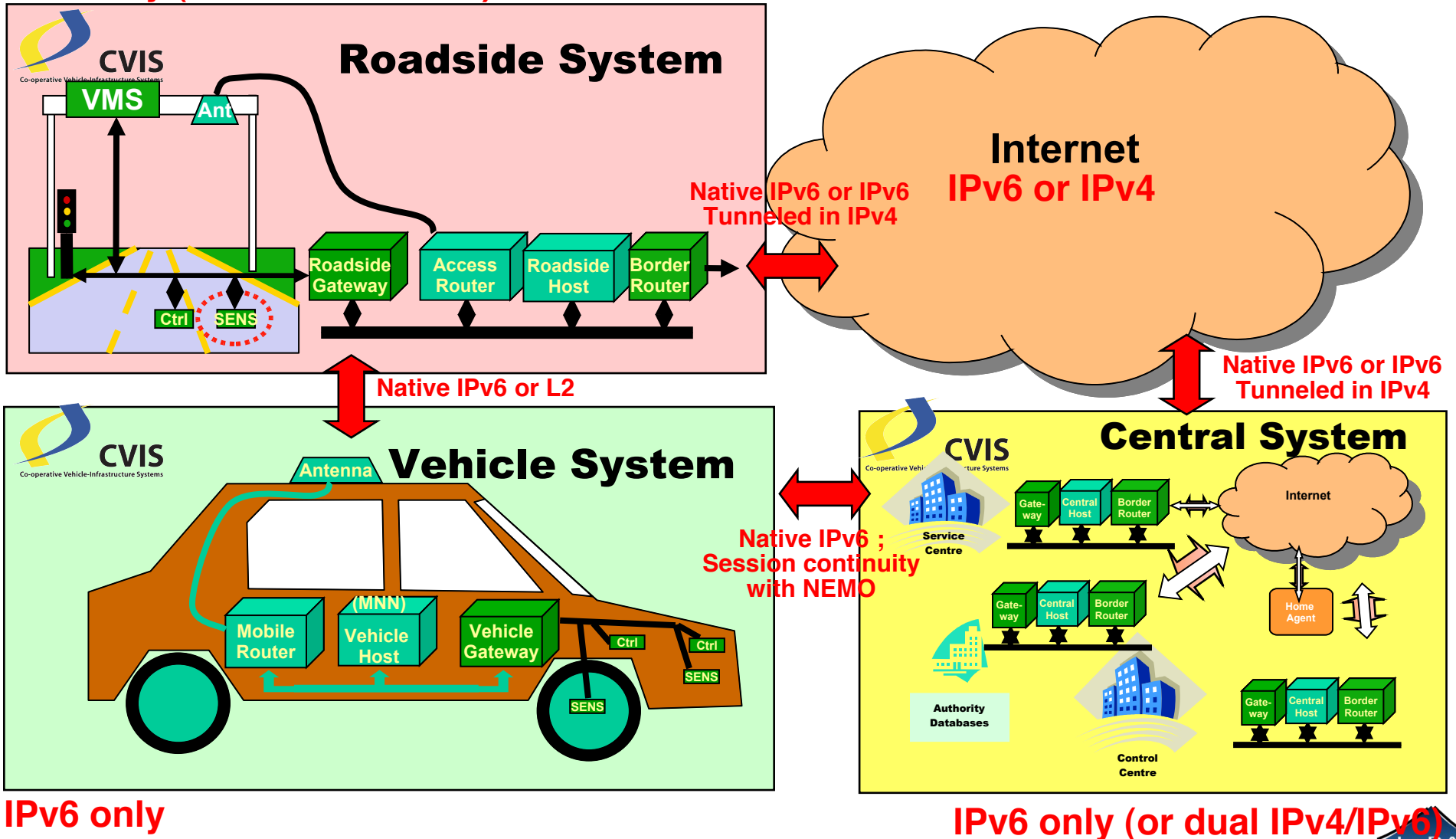
- ◆ <http://www.geonet-project.eu/>

- ◆ Combination of IPv6 (IETF) and C2C-CC standards

- ◆ Geographic addressing and routing

# The vehicle of the future: IPv6 Communications in CVIS

## IPv6 only (or dual IPv4/IPv6)



- ◆ “IPv6 for ITS” portal
  - ◆ web page recently set up – content under progress
  - ◆ <http://lara.inria.fr/ipv6/>
- ◆ CVIS: **C**ooperative **V**ehicle-**I**nfrastructure **S**ystem
  - ◆ <http://www.cvisproject.org>
- ◆ GeoNet
  - ◆ <http://www.geonet-project.eu/>
- ◆ ISO TC 204 WG 16: CALM Standard
  - ◆ <http://www.calm.hu>
- ◆ IPv6 Task Force France
  - ◆ <http://www.g6.asso.fr/tff>