



CVIS et GeoNet Architecture IPv6 pour les Systèmes Coopératifs

Thierry.Ernst@inria.fr

LARA (INRIA IMARA project-team & Ecoles des Mines Paris)

<http://www.lara.prd.fr>





- Coordinator: **ERTICO**
- Total budget: € 41 Million
- Consortium: 61 partners - 12 countries
- Focus: Efficiency – V2R services

Core Technologies



- ◆ Coordinator: **Fiat Research Centre**
- ◆ Total budget: € 38 Million
- ◆ Consortium: 51 partners - 12 countries
- ◆ Focus: Safety – V2V low latency

Car<->Car



- Coordinator: **Austria tech**
- Total budget: € 16,8 Million
- Consortium: 37 partners - 14 countries
- Focus: Roadside / Infrastructure

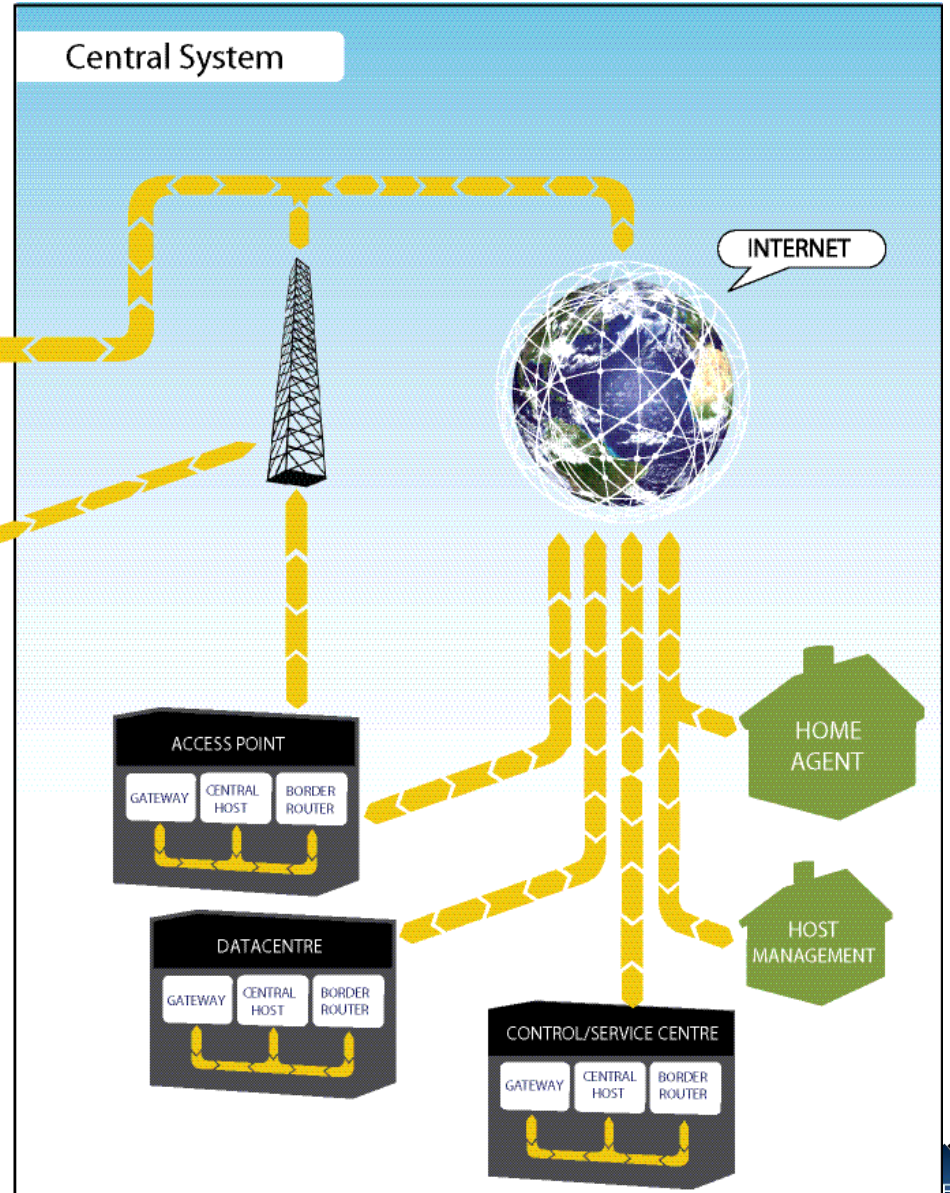
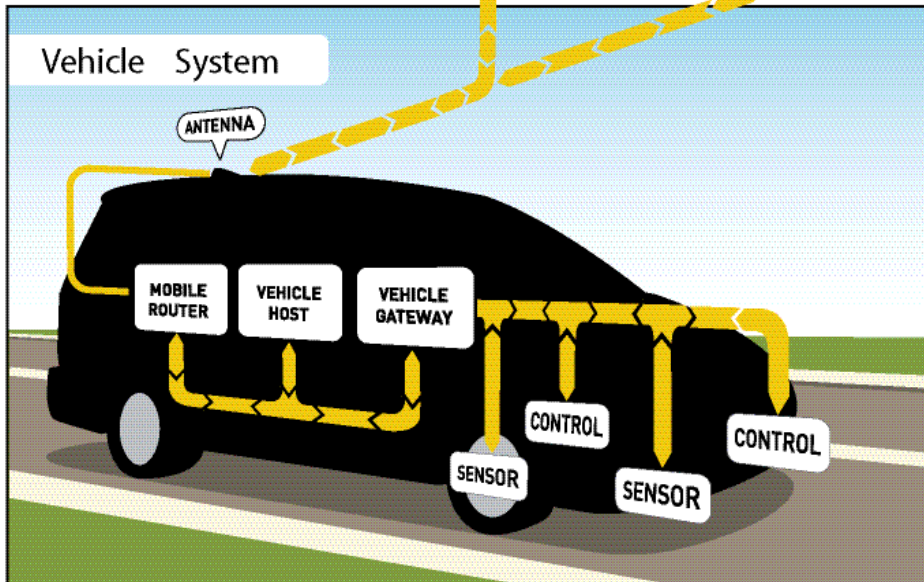
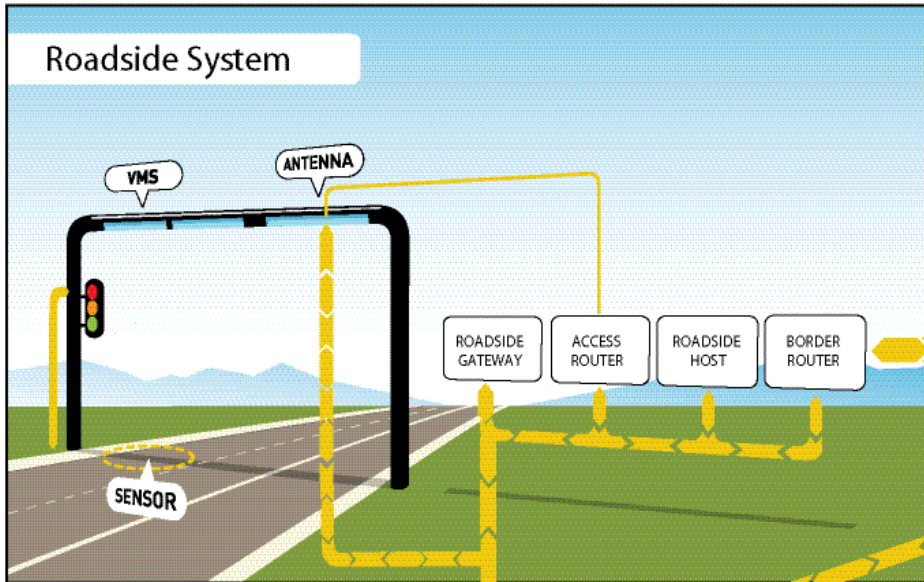
Car<->Infrastructure

- Co-operating projects also includes: **SEVECOM, COMeSafety, Car-2-Car Communications Consortium (C2C-CC), Network on Wheels (NoW), INVENT, ACTIV (Germany), CVHS (UK), IVSS (Sweden)**

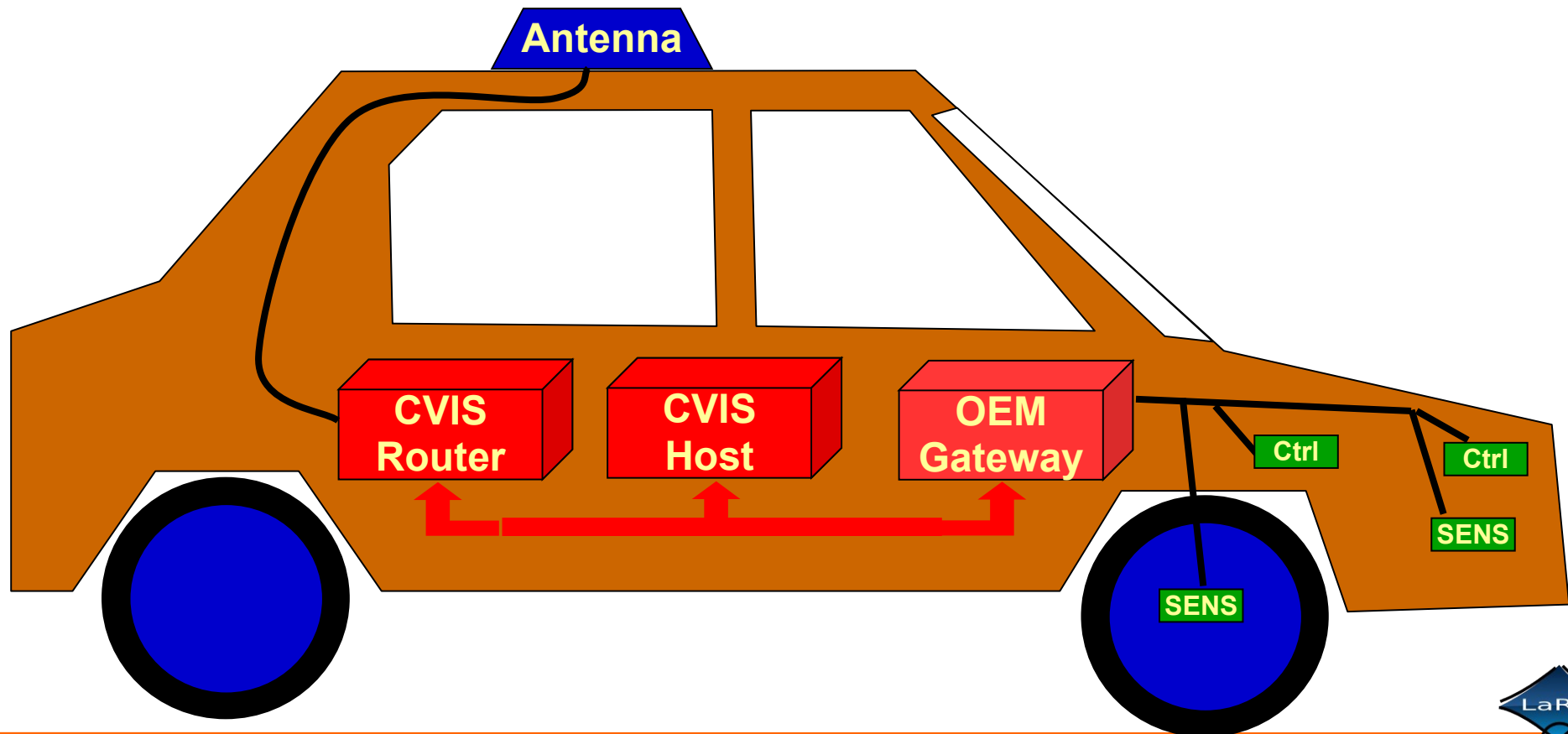
- ◆ Cooperative Vehicle-Infrastructure System
 - ◆ <http://www.cvisproject.org>
 - ◆ From Feb. 2006 till Feb. 2010
 - ◆ 61 partners / 12 countries / Total Budget: 41 Millions Euros

- ◆ Objectives
 - ◆ Develop, trial & demonstrate
 - ◆ **Inter-operable architecture for vehicular communications**
 - ◆ **Novel applications for:**
 - ◆ Cooperative traffic and road network monitoring
 - ◆ Cooperative road & traffic network management & control
 - ◆ Cooperative logistics & fleet management
 - ◆ Cooperative public transport & intermodality

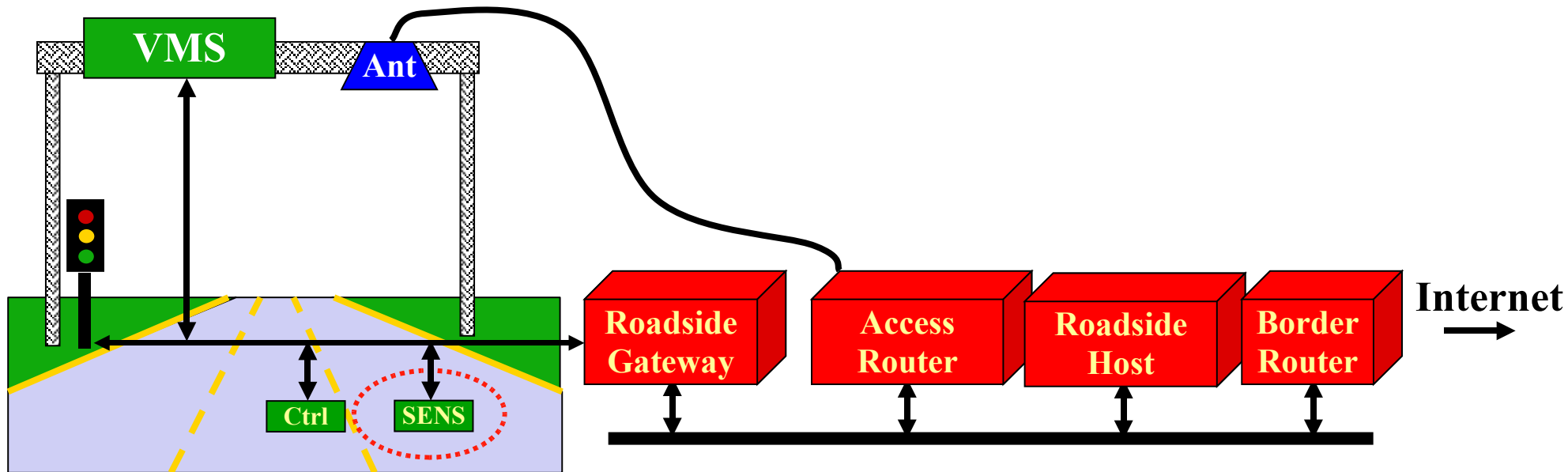
- ◆ Vision
 - ◆ Use and extend existing standards
 - ◆ Produce open design and software
 - ◆ Output intended to be reused by other EC projects



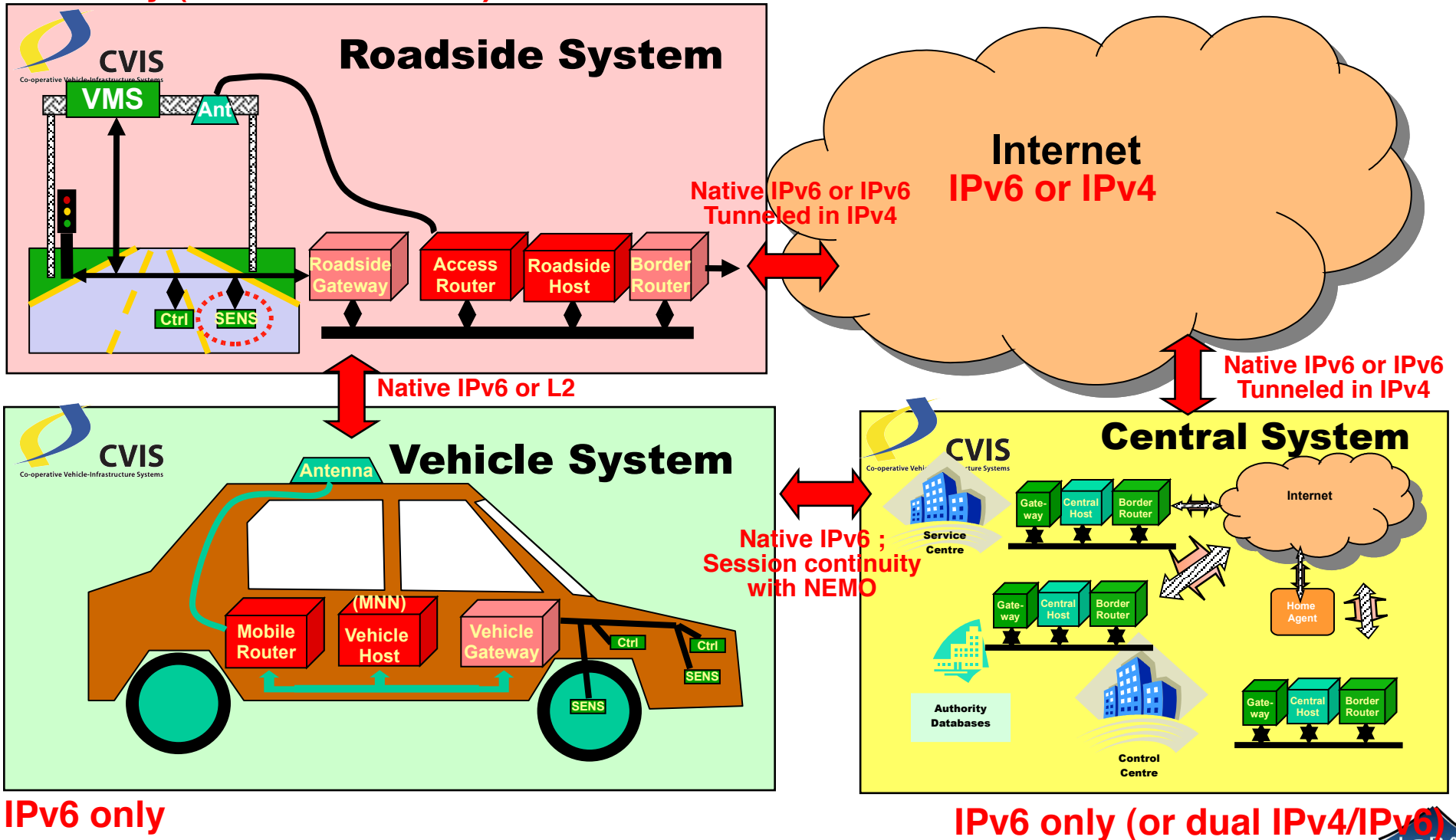
- ◆ In-vehicle IPv6 subnet
 - ◆ **CVIS Router**: Mobile Router maintaining Internet Access through several physical interfaces
 - ◆ **CVIS Host**: run dedicated ITS applications
 - ◆ **OEM Gateway**: between IPv6 and CAN



- ◆ Roadside IPv6 subnet
 - ◆ Roadside Host: Provides services to the vehicle
 - ◆ Access Router: Relays services to the vehicle
 - ◆ Border Router: Provides Internet access to the roadside
 - ◆ Roadside Gateway: between IPv6 and legacy roadside devices



IPv6 only (or dual IPv4/IPv6)

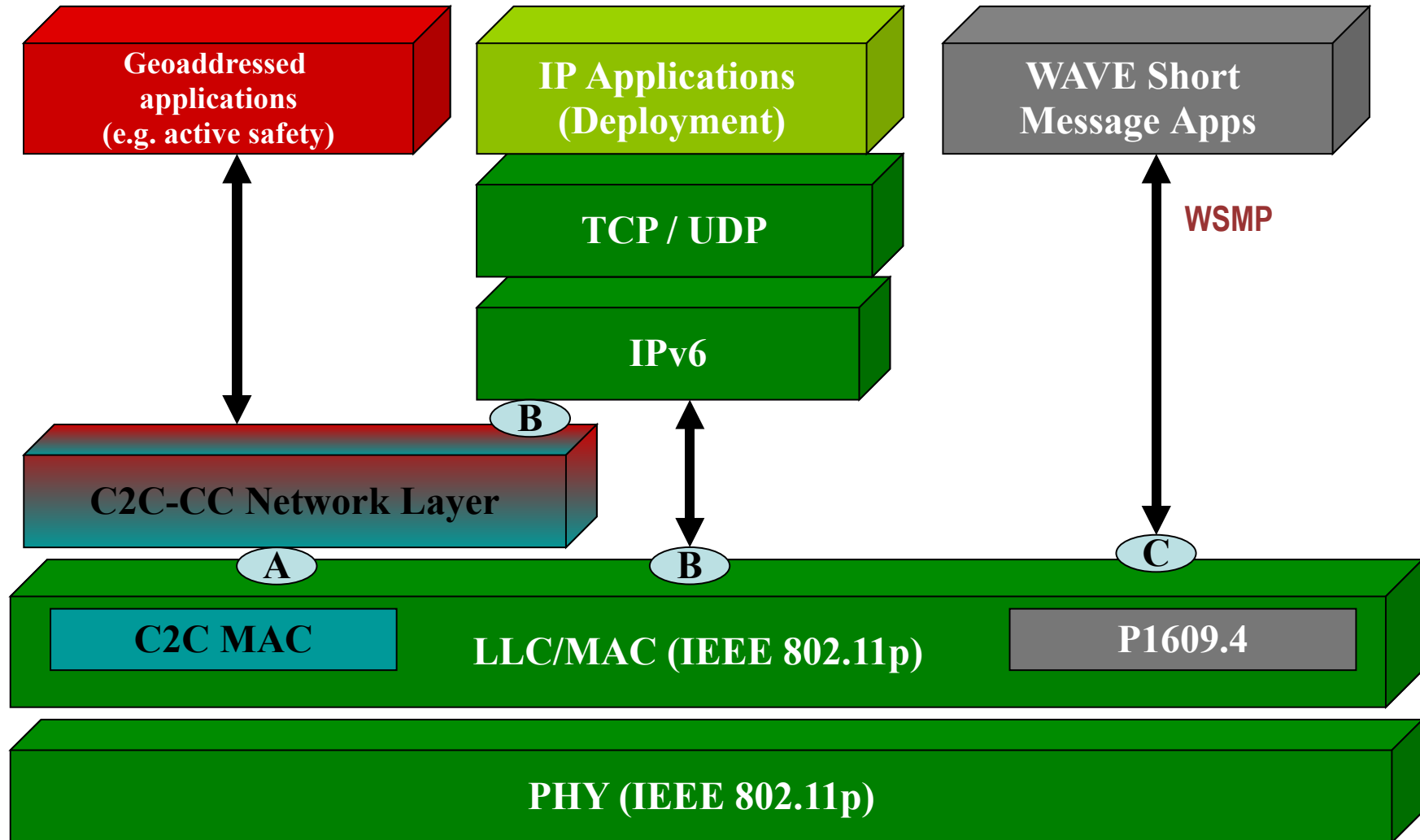


IPv6 only

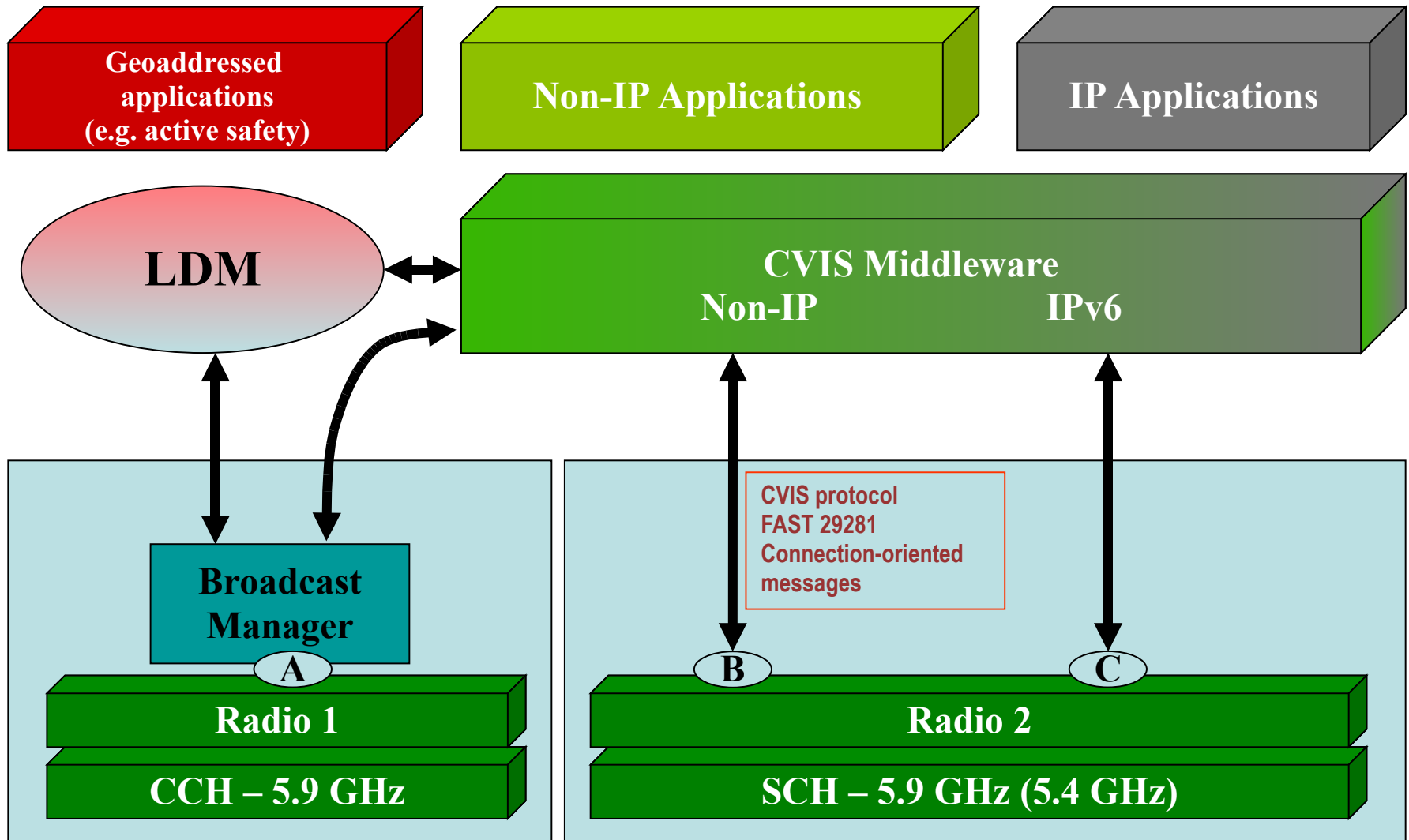
IPv6 only (or dual IPv4/IPv6)



CALM M5: IPv6, C2C-CC & WAVE



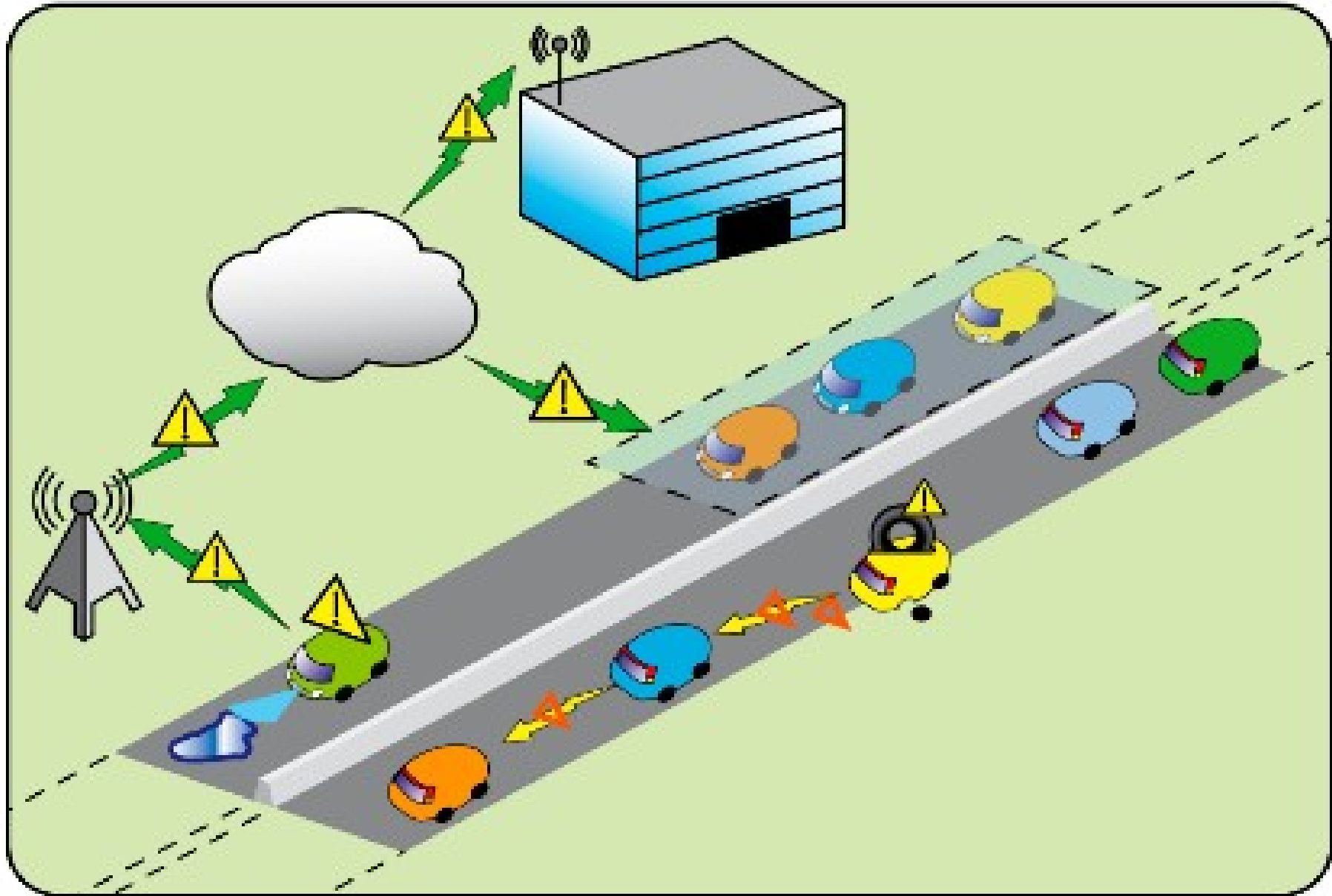
Simplified Architecture for SafeSpot & CVIS

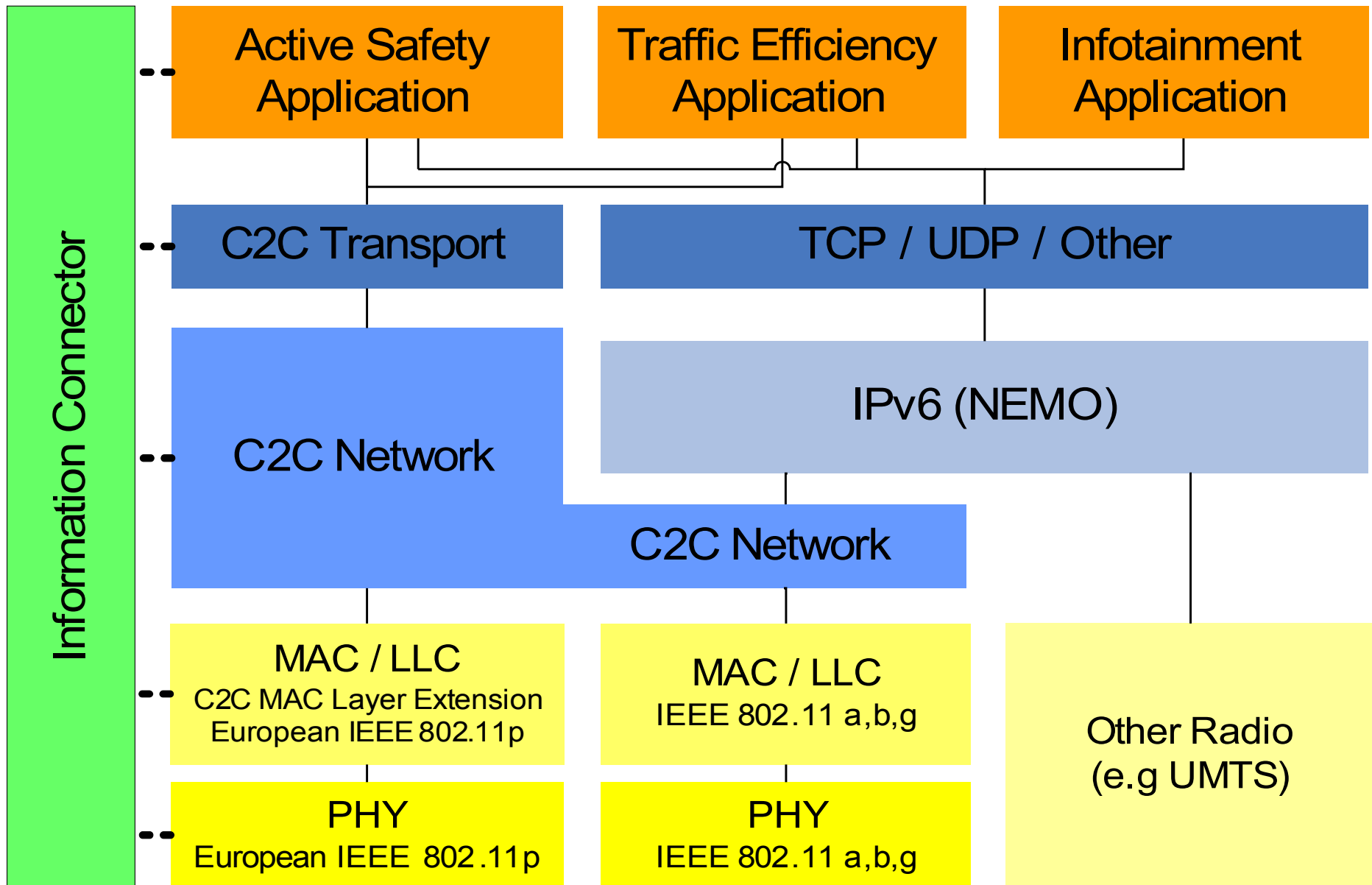


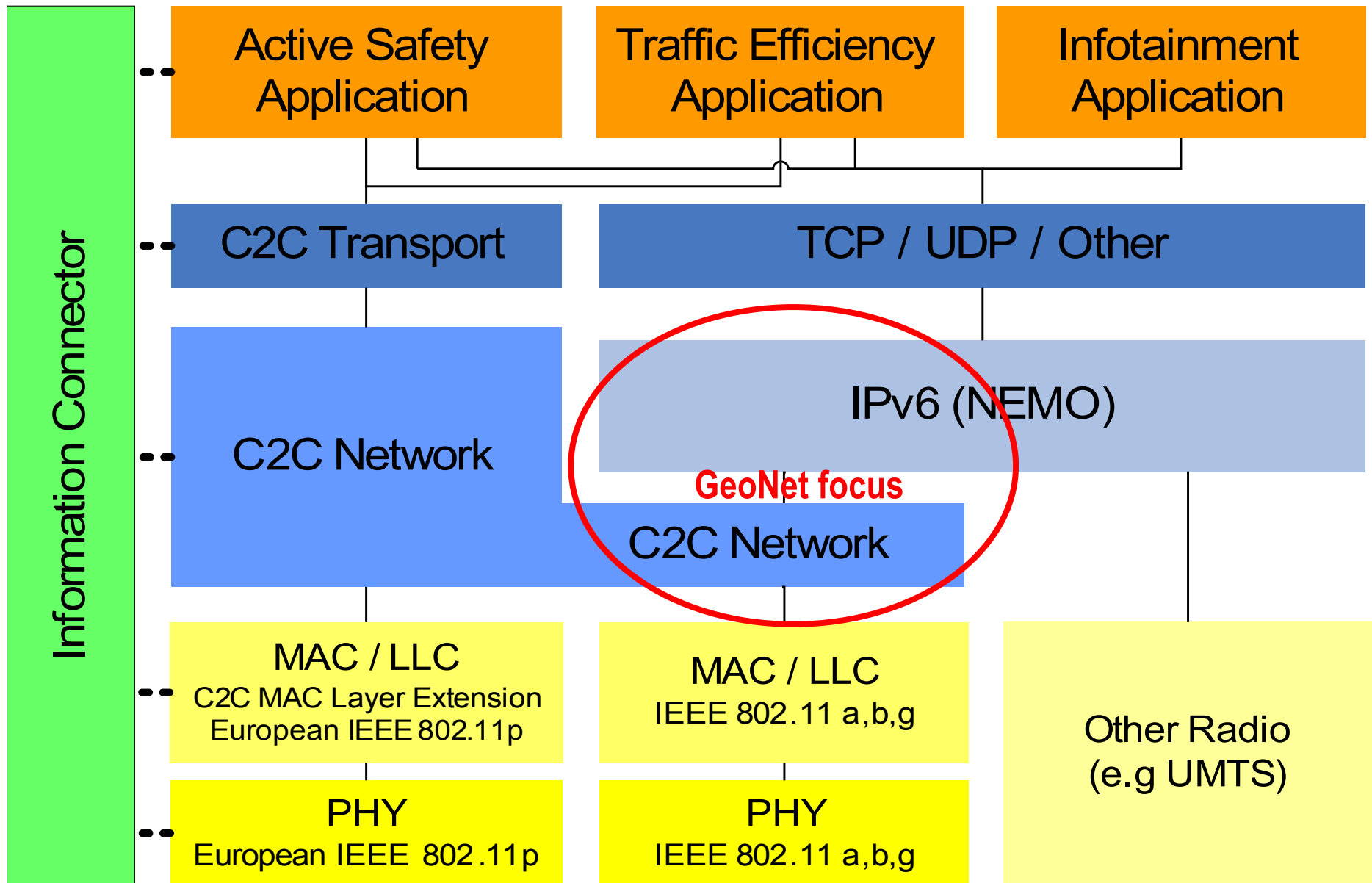
- ◆ FP7 European Project (STREP)
 - ◆ Feb. 2006 – Feb. 2010
 - ◆ Web: <http://www.geonet-project.eu>

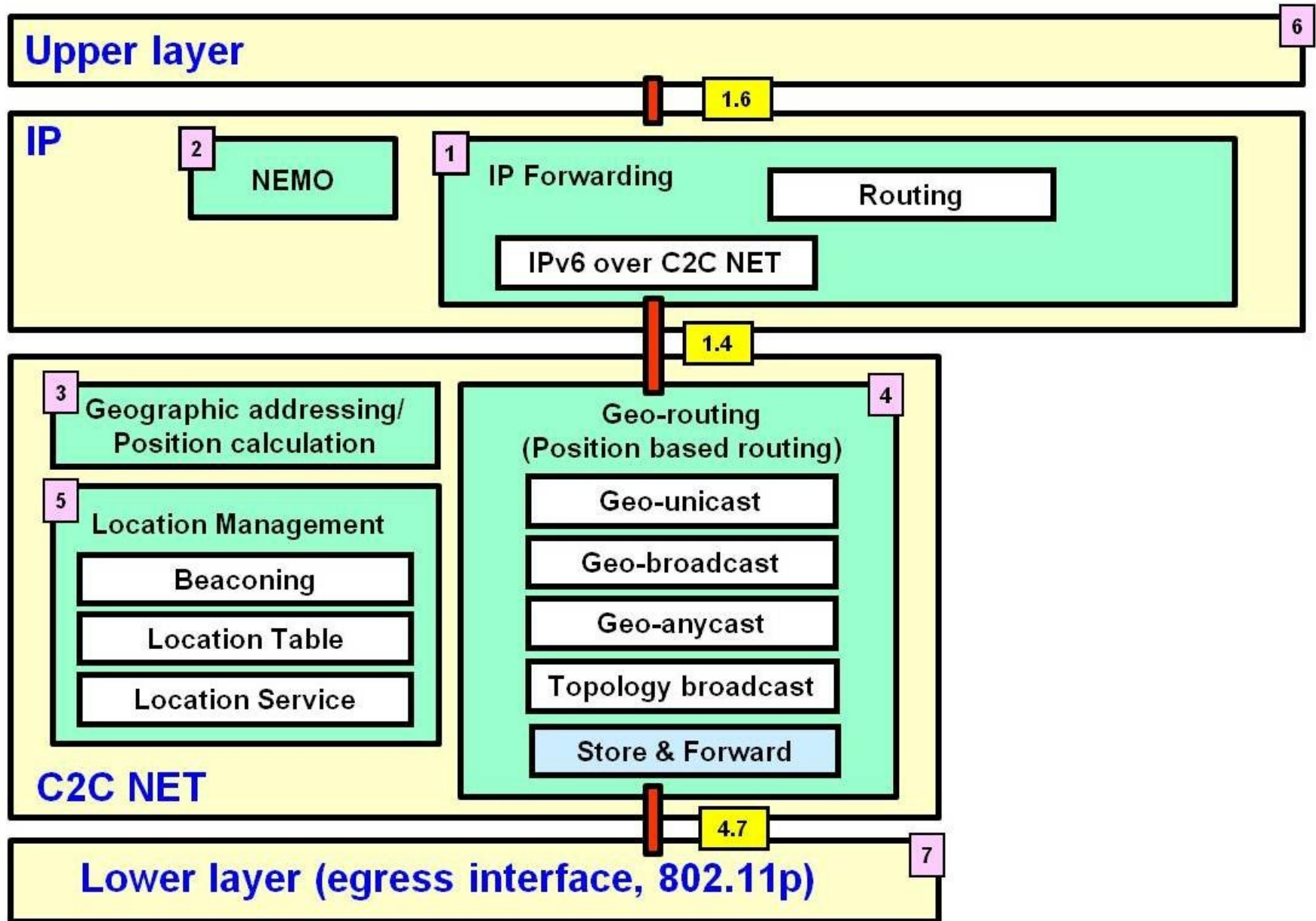
- ◆ Partners
 - ◆ INRIA (Coordinator)
 - ◆ Hitachi
 - ◆ NEC
 - ◆ Eikon
 - ◆ Lesswire
 - ◆ Broadbit
 - ◆ IMDEA networks

- ◆ Objective: Design the concepts linking geographic addressing and routing with IPv6 mobility mechanisms (IPv6 geonetworking)
 - ◆ Combination of IPv6 (IETF) and C2C-CC standards









Conclusions

- ◆ ITS community mostly agree that IP means IPv6 (i.e. when IP applies)
- ◆ IPv6 part of all architectures
 - ◆ ISO TC204 WG16 ([CALM](#))
 - ◆ [C2C-CC](#)'s IPv6 adaptation layer (FP7 [GeoNet](#))
 - ◆ [COMeSafety](#): European ITS Communication Architecture
 - ◆ [ETSI](#) TC ITS
 - ◆ WAVE
- ◆ IPv6 = key to unify all architectures
- ◆ Concept currently under validation
 - ◆ [CVIS](#): proof of concept of CALM
 - ◆ [GeoNet](#): combination of IPv6 and C2C-CC standards

Conclusions: Lessons learned from CVIS

- ◆ ITS community still lack IPv6 know-how and IPv6 training
 - ◆ How to get trained on IPv6
 - ◆ Where to get IPv6 access from
 - ◆ How much work necessary to be IPv6-compliant
 - ◆ How to adapt IPv6 standards to ITS needs (e.g. geonetworking, addressing, security)
- ◆ Conclusion:
 - ◆ IPv6 hands-on experience of the ITS sector largely not sufficient

Conclusions: Participation française dans les standards

- ◆ Faible représentation dans les standards
 - ◆ **ISO TC204 WG16 (CALM)**: seuls des académiques défendent les intérêts français (dont INRIA)
 - ◆ **ETSI – C2C-CC – COMeSafety**: sous représentativité française
- ◆ Des intérêts stratégiques sont pourtant en jeu pour l'industrie française
 - ◆ Industrie automobile
 - ◆ Industrie des télécommunications (au sens large)
 - ◆ **Les standards seront ce que les participants veulent qu'ils soient**
- ◆ Besoins
 - ◆ Inciter et faciliter la représentativité des **industriels**
 - ◆ Partage de l'information de l'évolution des standards
 - ◆ Organisation de séminaires

Conclusions: Expérience IPv6 en France

- ◆ Forte expertise IPv6 en France (ITS et autres)
 - ◆ G6: <http://www.g6.asso.fr>
 - ◆ IPv6 Task Force France <http://www.g6.asso.fr/tff>
 - ◆ Suggestion: tirer profit de cette expertise pour investir et contribuer aux standards ITS
- ◆ Déploiement d'IPv6 ne suit pas
 - ◆ Faire prendre conscience aux acteurs ITS français de l'arrivée d'IPv6
 - ◆ **Communiquer sur les avancées démontrées par CVIS**
 - ◆ **Communiquer sur l'impact d'IPv6**
 - ◆ **Communiquer sur les opportunités à saisir**
 - ◆ Faire suivre le message institutionnel
 - ◆ **Plan d'action IPv6 de la CE**
 - ◆ **Avis IPv6 du CGTI**
 - ◆ **Discours Besson**
 - ◆ **Plan “France Numérique 2012”**

- ◆ ISO TC 204 WG 16 (CALM): <http://www.calm.hu>
- ◆ CVIS: <http://www.cvisproject.org>
- ◆ COMeSafety: <http://www.comesafety.org>
- ◆ GeoNet: <http://www.geonet-project.eu/>
- ◆ IPv6 for ITS portal: <http://lara.inria.fr/ipv6/> (under construction)
- ◆ LaRA: <http://www.lara.prd.fr>



Merci pour votre attention



INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET EN AUTOMATIQUE

Thierry.Ernst@inria.fr

LARA (INRIA IMARA project-team & Ecoles des Mines Paris)

<http://www.lara.prd.fr>

