Standards for Vehicle Gateway

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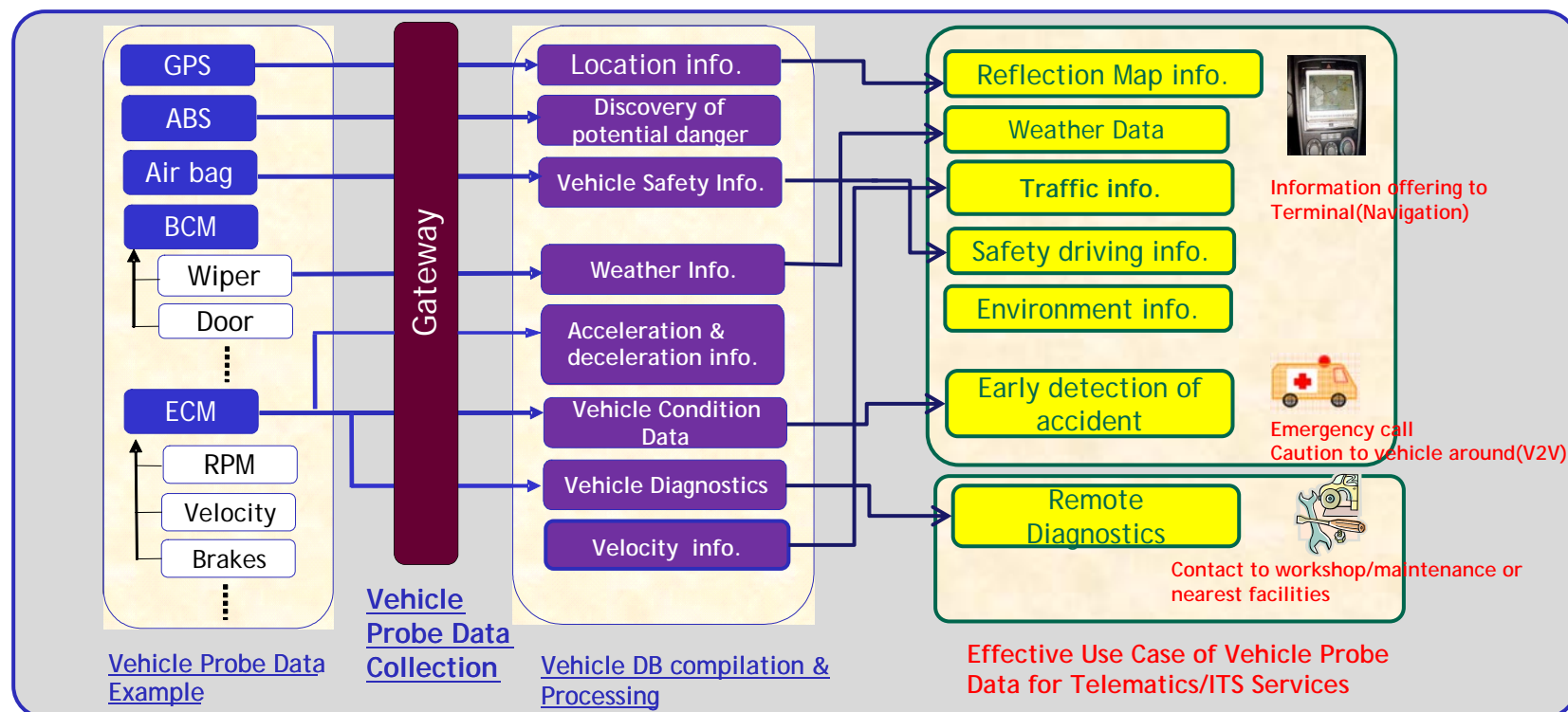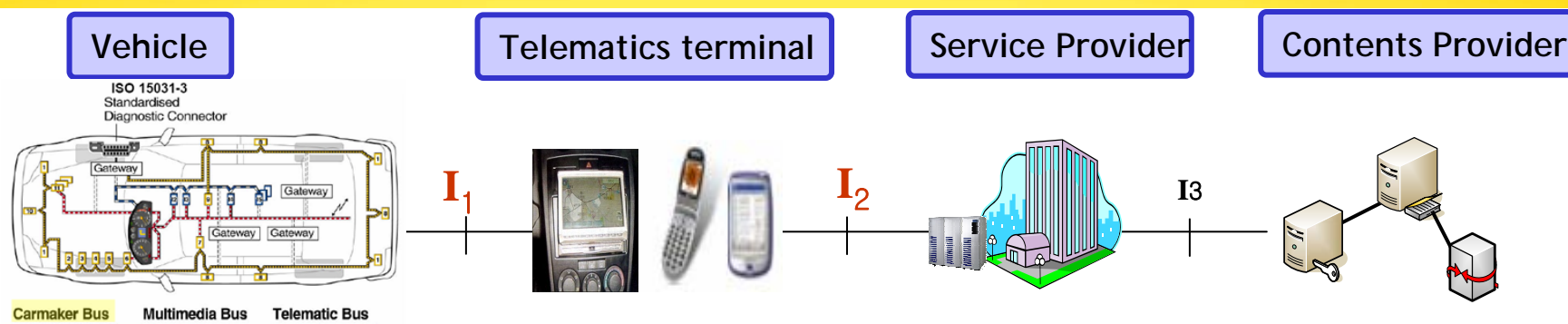
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Outline

o   Vehicle Gateway for Telematics/ITS Services

o   Standards for Vehicle Gateway

- NM Gateway AUTOSAR
- OSGi Vehicle Interface
- Vehicle Gateway AMI-C (ISO 22902)
- M-VCI (ISO 22900)
- Car gateway for V2I(MYCAREVENT)

o   Conclusions and outlooks

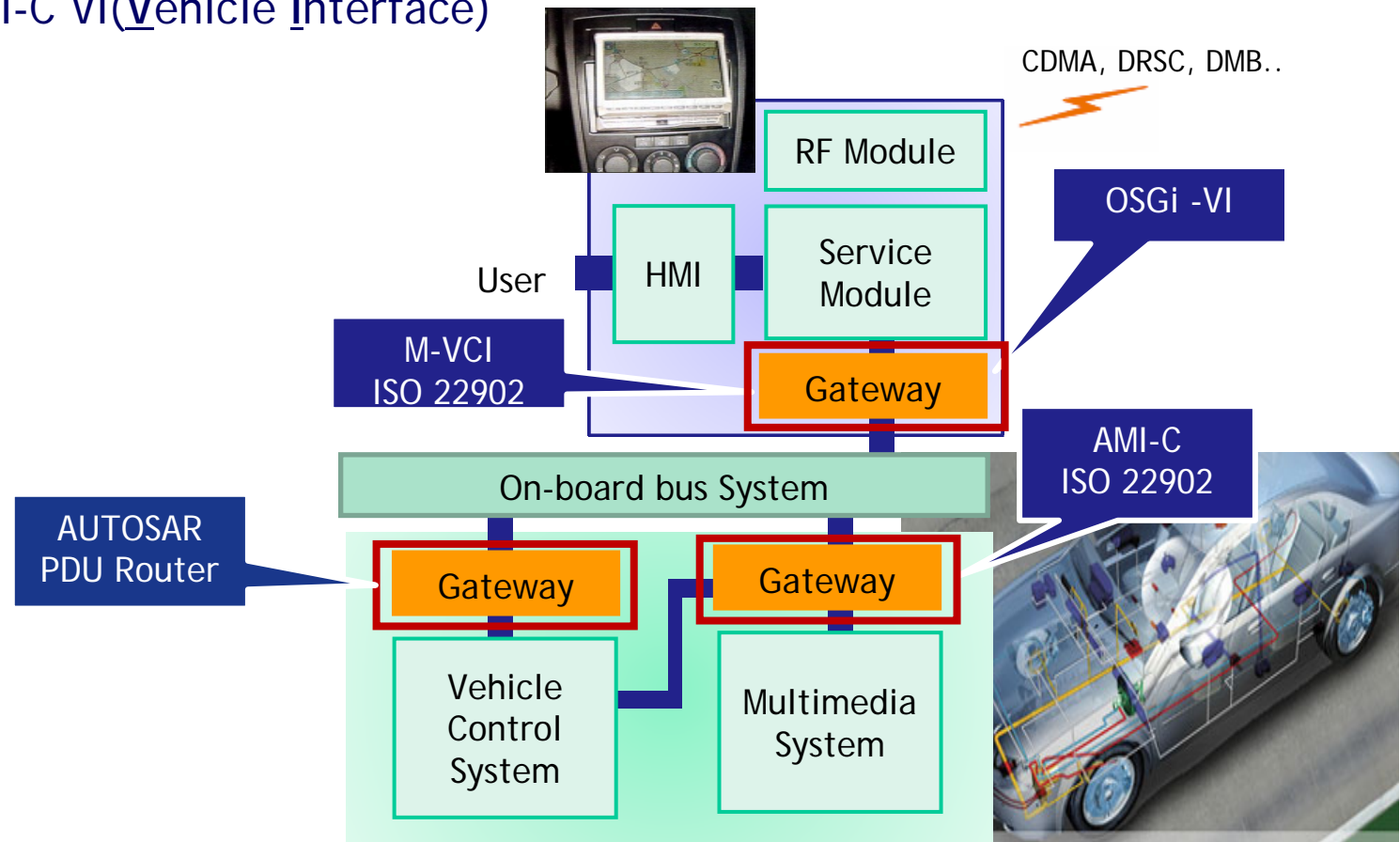# Vehicle Gateway for Telematics/ITS Services

Vehicle | **Telematics terminal** | **Service Provider** | **Contents Provider**

ISO 15031-3
Standardised
Diagnostic Connector
Gateway
Gateway
Gateway

Carmaker Bus Multimedia Bus Telematic Bus

I_1 I_2 I3

Vehicle components (left):
- GPS
- ABS
- Air bag
- BCM
  - Wiper
  - Door
- ECM
  - RPM
  - Velocity
  - Brakes

Gateway

Vehicle Probe Data Collection:
- Location info.
- Discovery of potential danger
- Vehicle Safety Info.
- Weather Info.
- Acceleration & deceleration info.
- Vehicle Condition Data
- Vehicle Diagnostics
- Velocity info.

Vehicle DB compilation & Processing:
- Reflection Map info.
- Weather Data
- Traffic info.
- Safety driving info.
- Environment info.
- Early detection of accident
- Remote Diagnostics

Information offering to Terminal(Navigation)

Emergency call
Caution to vehicle around(V2V)

Contact to workshop/maintenance or nearest facilities

Vehicle Probe Data Example

Vehicle Probe Data Collection

Vehicle DB compilation & Processing

Effective Use Case of Vehicle Probe Data for Telematics/ITS Services

The Fully Networked Car
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ISO   IEC   ITU International Telecommunication Union

o AUTOSAR : PDU Router/Signal Gateway for CAN, LIN, FlexRay Interfaces

o OSGi –VI : **V**ehicle **I**nterface for Telematics Service Platform

o ISO 22902 : **M**odular **V**ehicle **C**ommunication **I**nterface
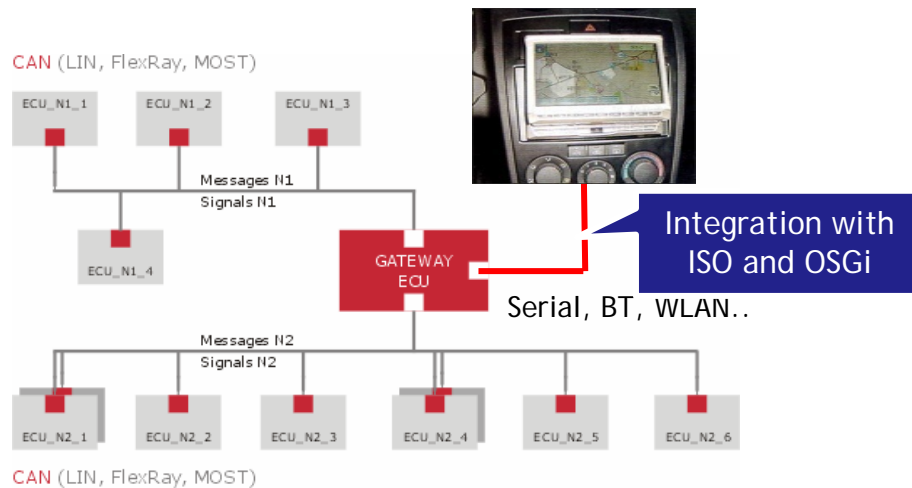
o ISO 22900 : AMI-C VI(**V**ehicle **I**nterface)

CDMA, DRSC, DMB..

RF Module

OSGi -VI

User | HMI | Service Module

M-VCI
ISO 22902 | Gateway

AMI-C
ISO 22902

On-board bus System

AUTOSAR
PDU Router | Gateway | Gateway

Vehicle Control System | Multimedia System

NM Gateway in AUTOSAR

o AUTOSAR **N**etwork **M**anagement Gateway Functionality

- Frame-based Gateway (PDU Router)
- Signal-based Gateway (COM)

o AUTOSAR Phase II (2007~2009)

- Interface standardization on application level
- Telematics API (collecting vehicle probe data)
- Integration with ISO standards and OSGi Vehicle Interface

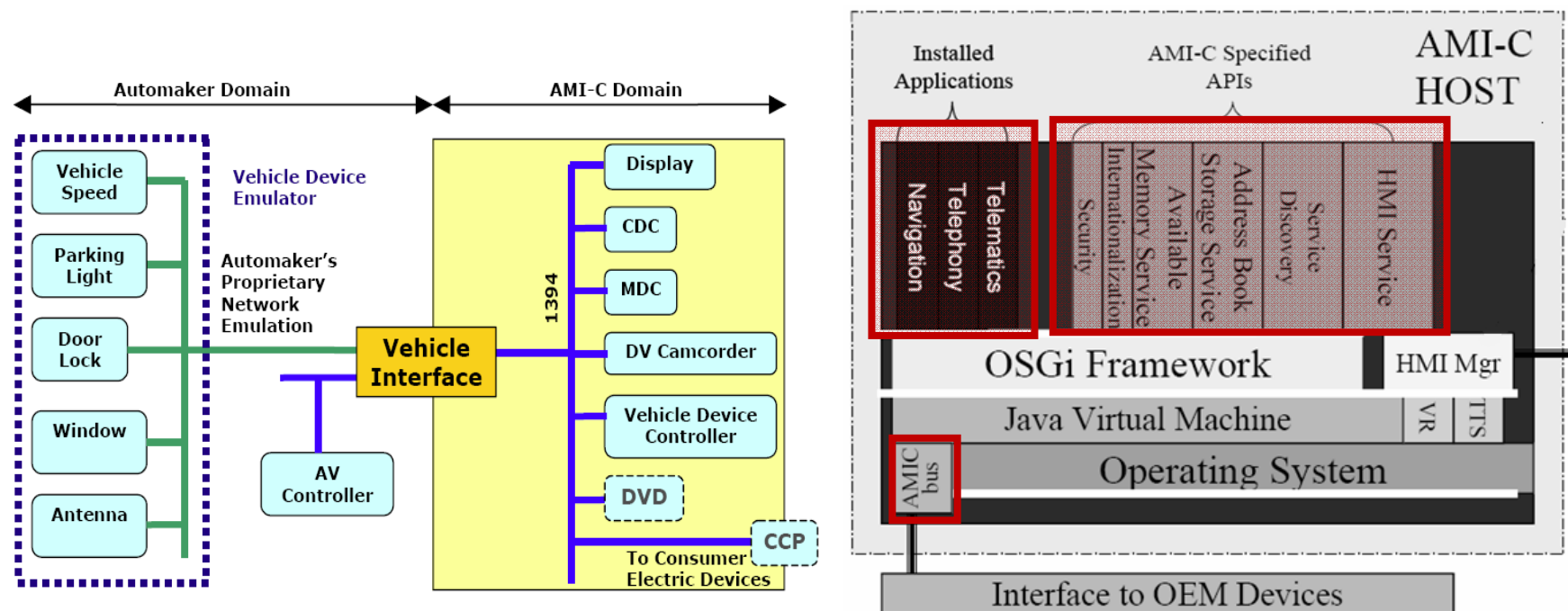**The Fully Networked Car**
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Source : AUTOSAR (AUTomotive Open System ARchitecture)
www.autosar.org
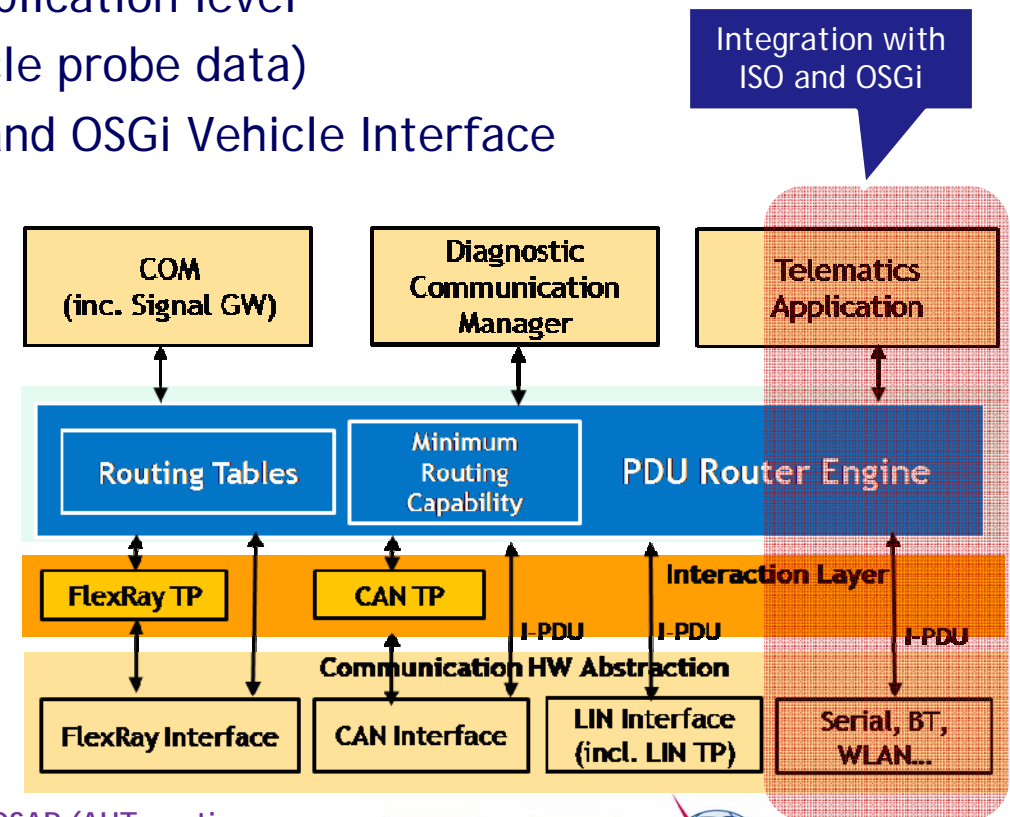
Vehicle Interface in AMI-C

o   ISO 22902 AMI-C Architecture

- Application View : how to provide the standard interface to Apps
- Structure View : vehicle interface, network, host
- Functional View : service discovery, system management, security, HMI

o   Vehicle Interface(Gateway)

- Translate Apps request into appropriate messages or protocols


The Fully Networked Car
Geneva, 5-7 March 2008

Source : ISO 22902 AMI-C

o **OSGi Technology is Universal Middle**

o **OSGi Vehicle Expert Group**

- Goal :
  – Provide the technical foundation for projects like VII, GST ..
  – Create a business model for service providers, aggregators, and OEMS

- Major Issues
  – "Off-board" Diagnostics (need vehicle bus type abstraction)
  – <u>**Vehicle Interface(VAPI : Vehicle API)**</u>
  – Navigation APIs
  – <u>**Integration with AUTOSAR defined system**</u>
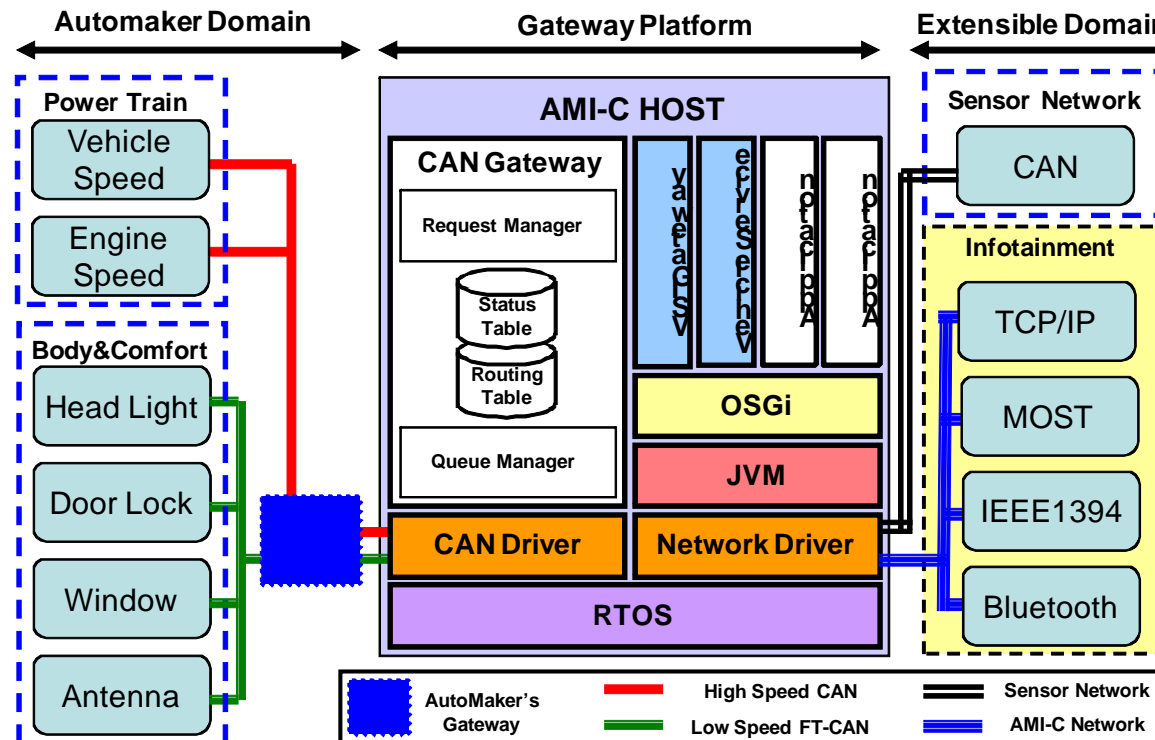 – Communication Manager for mobile session management
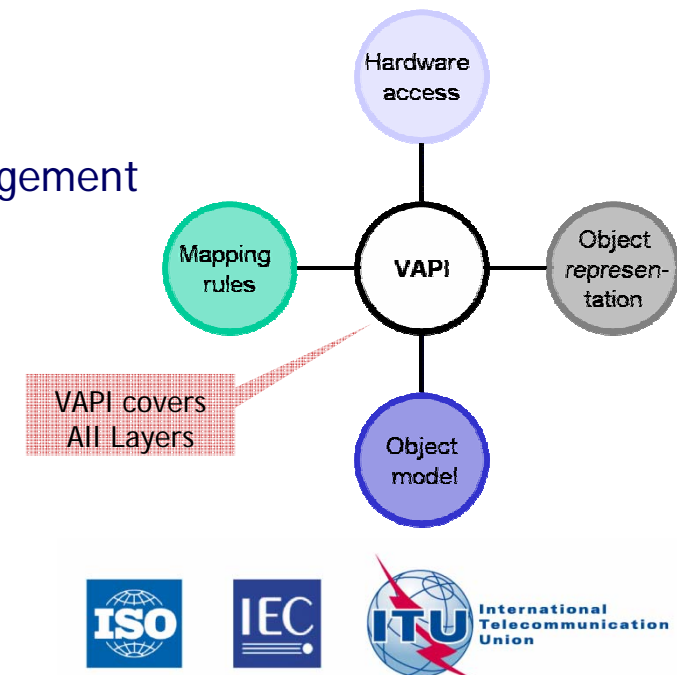
o Vehicle Sensor Gateway

- Based on AMI-C HOST platform
- In-vehicle CAN gateway for Interworking with AMI-C Vehicle Interface
- Adding the Sensor Network (via CAN bus)

Source : Telematics/ITS Technology
Workshop in KOREA (2007)
KATECH Sensor Gateway
Korea Automotive Technology Institute

o **Modular Vehicle Communication Interface (ISO 22900)**

o **Motivation**
  - Non standardized diagnostic connector in vehicles

o **MVCI HW**
  - Using by All vehicle manuf. for service outlets and aftermarket

o **MVCI SW**
  - Standardized APIs to support manufacturer specific service diagnostic applications

o **Next Steps**
  - Standardized Application APIs for Telematics, Logistics and so on.

NO Application Standards

Apps

| Workshop Apps. | Manuf. Apps. | Roadside Apps. | Diagnostics Apps. |

Wireless/Wired Connection
TCP/IP on USB, TCP/IP on Ethernet

Diag. Server

ISO 22900-3 MVCI D-Server API

Diagnostic Kernel

ISO 22900-2 MVCI D-PDU API

USB/Ethernet/WLAN ...

VCI

ISO 22900-2 MVCI D-PDU API

Modular VCI

MVCI Protocol Module(Protocols)

UDS

ECUs

ECM   TCM   BCM   ....   Autosar   OSEK
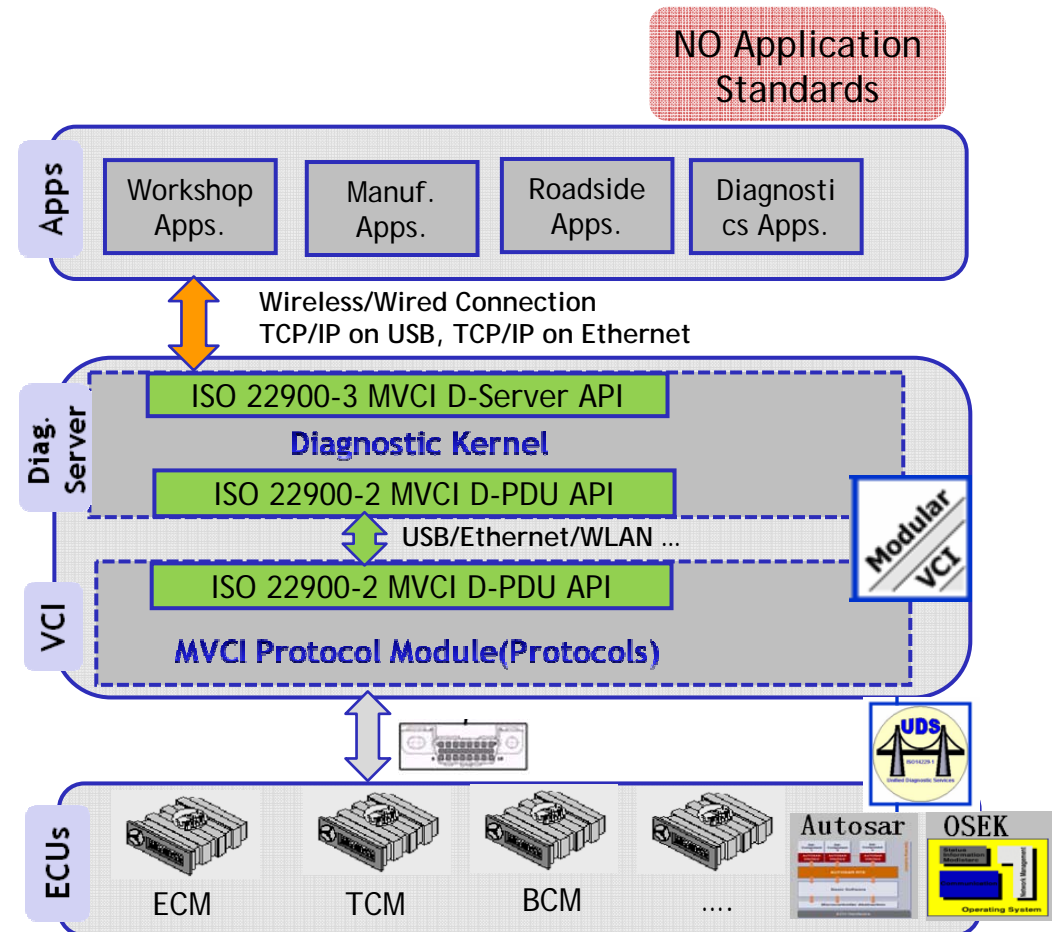
Source : ISO 22900 Modular Vehicle Communication Interface

ISO   IEC   ITU International Telecommunication Union

o MYCAREVENT for optimizing the European market for automotive services and repair.

o Central Communication Device for managing in-vehicle, inter-vehicle, vehicle-to-infrastructure communication

o Integrated Car gateway with in-vehicle network <u>for collecting and transmitting probe data</u>
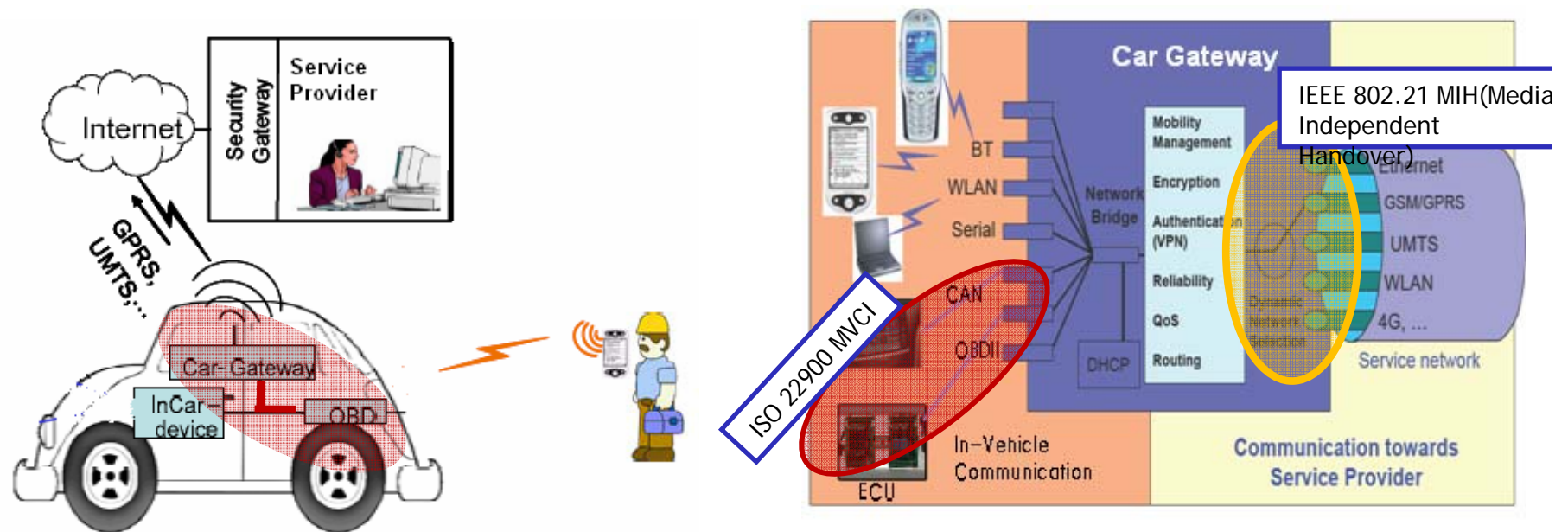
**The Fully Networked Car
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Source : MYCAREVENT Project
MobilitY and CollAboRative work
in European Vehicle Emergency
NeTworks

Conclusion and outlook

o   Telematics/ITS Services need standards framework for collecting vehicle probe data

o   Standards for vehicle gateway or vehicle interface

- NM Gateway AUTOSAR
- OSGi Vehicle Interface
- Vehicle Gateway AMI-C (ISO 22902)
- M-VCI (ISO 22900)

o   Challenges for Telematics based vehicle probe data

- Will OEMs open the OBE open up to third party applications ?
- Need Integrated Standards for Vehicle Interface or Vehicle Gateway

Thank you for attention !