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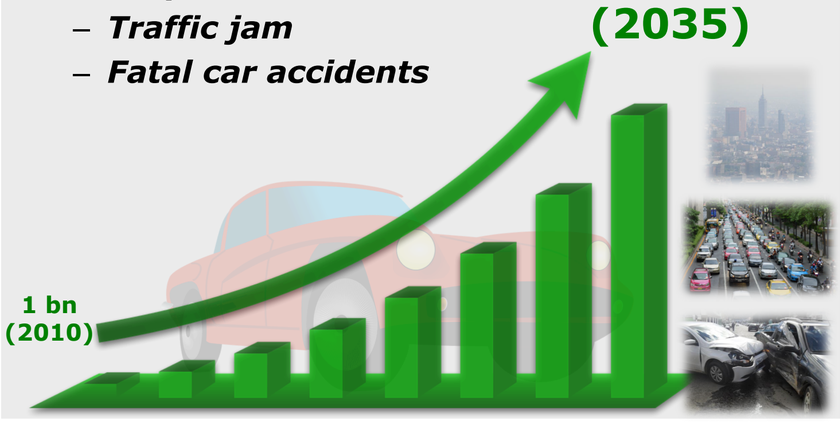
Multi-Objective flow-interface mapping in heterogeneous and mobile networks

Rodrigo SILVA
Jean-Marie BONNIN

Context — Vehicles should be connected

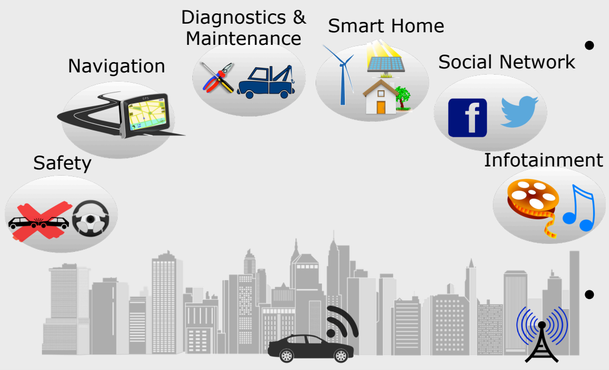
Number of vehicles growing worldwide

- Impacts in our quality of life:
  - ***Air pollution***
  - ***Traffic jam***
  - ***Fatal car accidents***



Connected vehicles

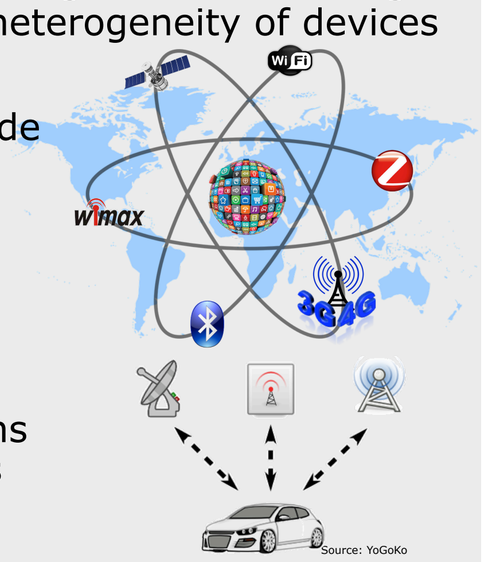
- Despite applied countermeasures, deaths on cars accidents remains high ➔ Need to reduce human intervention ➔ Connected cars



- **Connected cars** would be a **major element of the IoT** ➔ representing 20% of all devices on 2020 (Gartner, Inc.)
- Ecosystem of Services

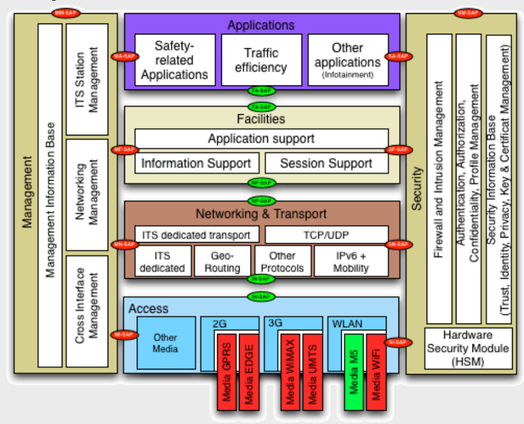
Network heterogeneity

- Necessary to use existing access technologies to connect all these heterogeneity of devices
- Vehicles could take advantage from a wide variety of wireless access technology
- on-board gateways could provide transparent network connectivity to embedded applications and on-board devices



Standardization

- To ensure compatibility of communication in heterogeneous environment of different devices, applications and networks ➔ necessary a standard architecture (ISO/ETSI)



Research works — Overview of recent research works

Decision Making

- Few works consider use of multi-interface simultaneously and routing flow per flow
- Different decision techniques are used: Multi-Attribute Decision Making (MADM); Multi-Objective Optimization (MOO), Game theory

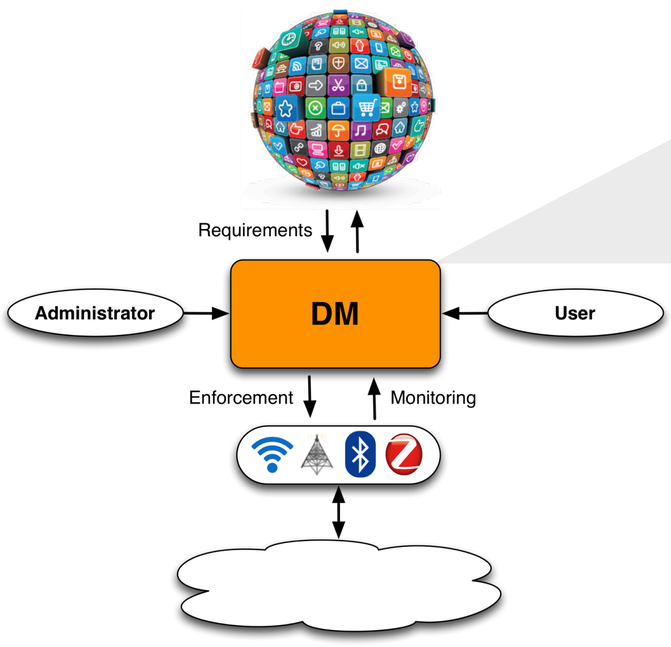
Monitoring

- Most works consider cooperation with networks based on the standard 802.21 (MIH)

Applying decision

- Decisions applied on the network layer, usually using MIP and NEMO + MCoA

Realization of thesis — Smart Decision Maker



- Necessary an intelligent decision maker to flow-interface mapping:
  - Taking into account Applications' requirements, Users preferences, Administrators' policies and Networks characteristics
  - Capable to perform **Flow per Flow** management
  - Use **short-term prediction** for smarter solution
  - Management of **multiple interface simultaneously**
  - Take into account **context information**

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