From smart to elastic and collaborative mobility

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Smart and Sustainable cities

- **Mobility** & transportation:
  - vital for modern cities operation
- However… several **problems** are caused, especially in urban and densely populated areas:
  - GHG emissions / noise
  - Accidents
  - Traffic congestion
- Whereas… several **megatrends** will influence the development of future smart cities:
  - Urbanization
  - Climate change
  - Insufficient fossil fuel
- Solution?
  - **New technologies** part of the transition to sustainable mobility
Smart Mobility

- The user's ability to move **efficiently and intelligently** using the most appropriate means of transport and taking advantage of the advances in ICT technologies (e.g. smartphones, cloud technologies)

- **Collaboration** is a key concept towards enhanced and environmentally aware mobility for all citizens, building on cooperative systems, reliable real-time data, and on active participation of all network actors.
Concept of Elastic and Collaborative Mobility (1)

- Vehicles and infrastructure already communicate.
Concept of Elastic and Collaborative Mobility (2)

- Smartphones and cloud services will be connected, too.
Now drivers and travelers are integrated to participate.
Elastic Infrastructure Objectives (1)

- **Elastic traffic infrastructures** - let infrastructures start to be flexible and change based on citizens’ or cities’ needs

- Provide “on demand” mobility services to offer maximum flexibility in the usage of different transport modes (multi-modal mobility)

- Develop **collaborative applications** targeting mainly at the enhancement of **energy efficiency** and **environmental friendly mobility**
Elastic Infrastructure Objectives (2)

• Flexible use of available mobility facilities (i.e. road lanes, parking places etc.) by making a **sustainable** dynamic planning

• **Cooperative control sensing and optimization algorithms** able to:
  • *evaluate mobility decisions*
  • *orchestrate different user alternatives* to increase traffic efficiency and optimize mobility
Challenges

• Technical
  • Communications convergence (802.11p, LTE)
  • Data cloud and positioning accuracy
  • Privacy and security

• Scientific
  • Large scale systems (infrastructure information and mobile data)
  • Consider all road users and their interactions
  • Regulate the system in a decentralized best-effort manner
  • Elastically respond to the changing needs of the participating actors
Conclusions

• **Sustainability** is a challenge in modern cities
• **Mobility** is one of the major problems
• **Elastic and Collaborative Infrastructure**: key concept for addressing transport problems of modern cities
• Need for **investments** and **research** (e.g. optimisation & control)
• Support and willingness of all the involved **stakeholders**
Thank you!

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