Towards a Reference Architecture for a Collaborative Intelligent Transport Systems Infrastructure

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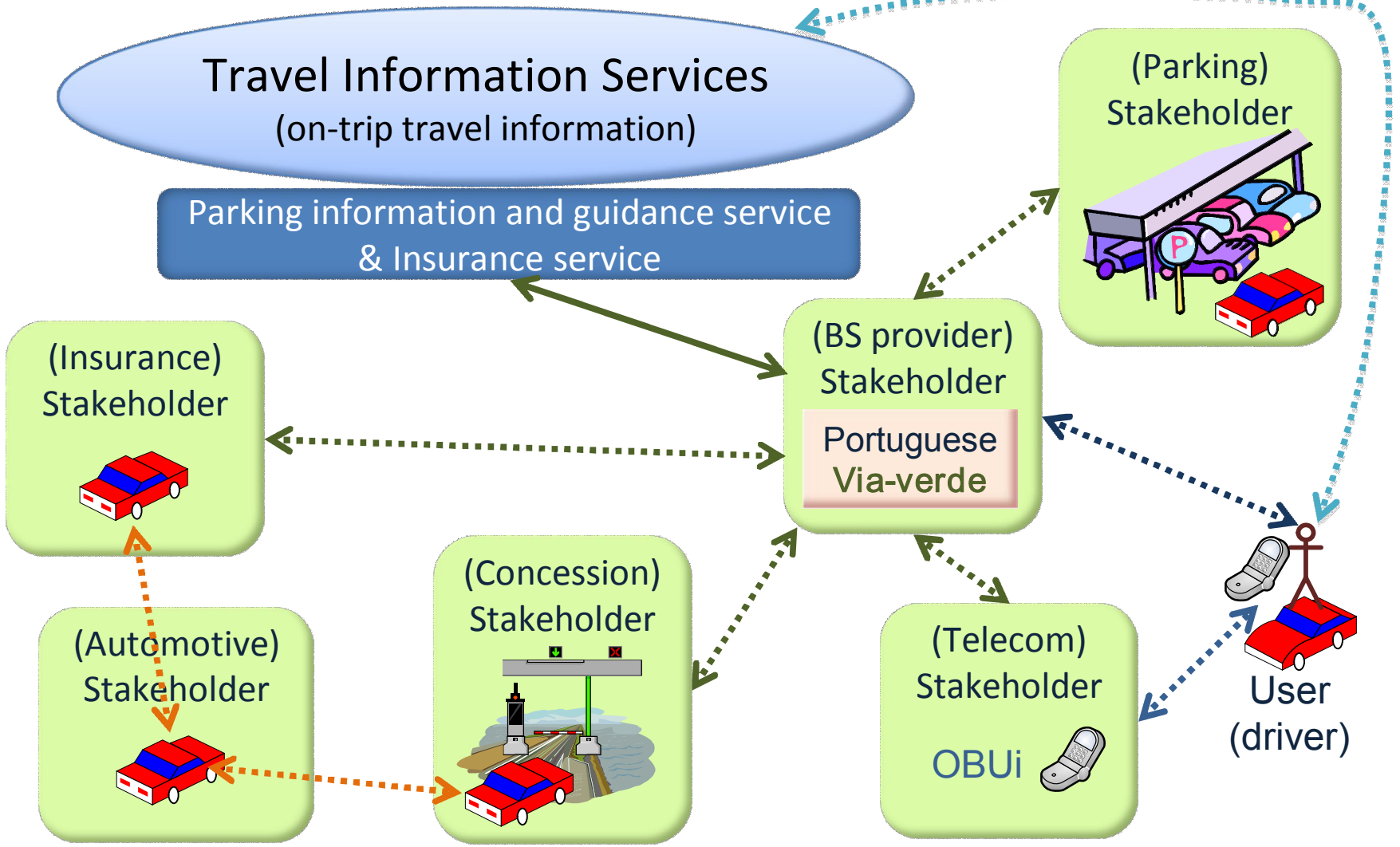
Topics

- The Intelligent Transport Systems Challenge
- Towards an ITS intelligent infrastructure architecture
- The two cooperative/interoperability dimensions
  - Collaboration-oriented Mobility Infrastructure
  - Intelligent Road Mobility Infrastructure
- Conclusions and future work

The Intelligent Transport Systems (ITS) Challenge

- A multidisciplinary area with challenges beyond existing ICT architectures
- In essence of ITS, ICT plays a crescent role on coping with emergent intelligent services
  - Traffic safety; intelligent mobility, integrated national-wide and pan-European services (payment, information, security, logistics)
- ITS services involve the participation of different stakeholders (organizational, social and technological diversity)

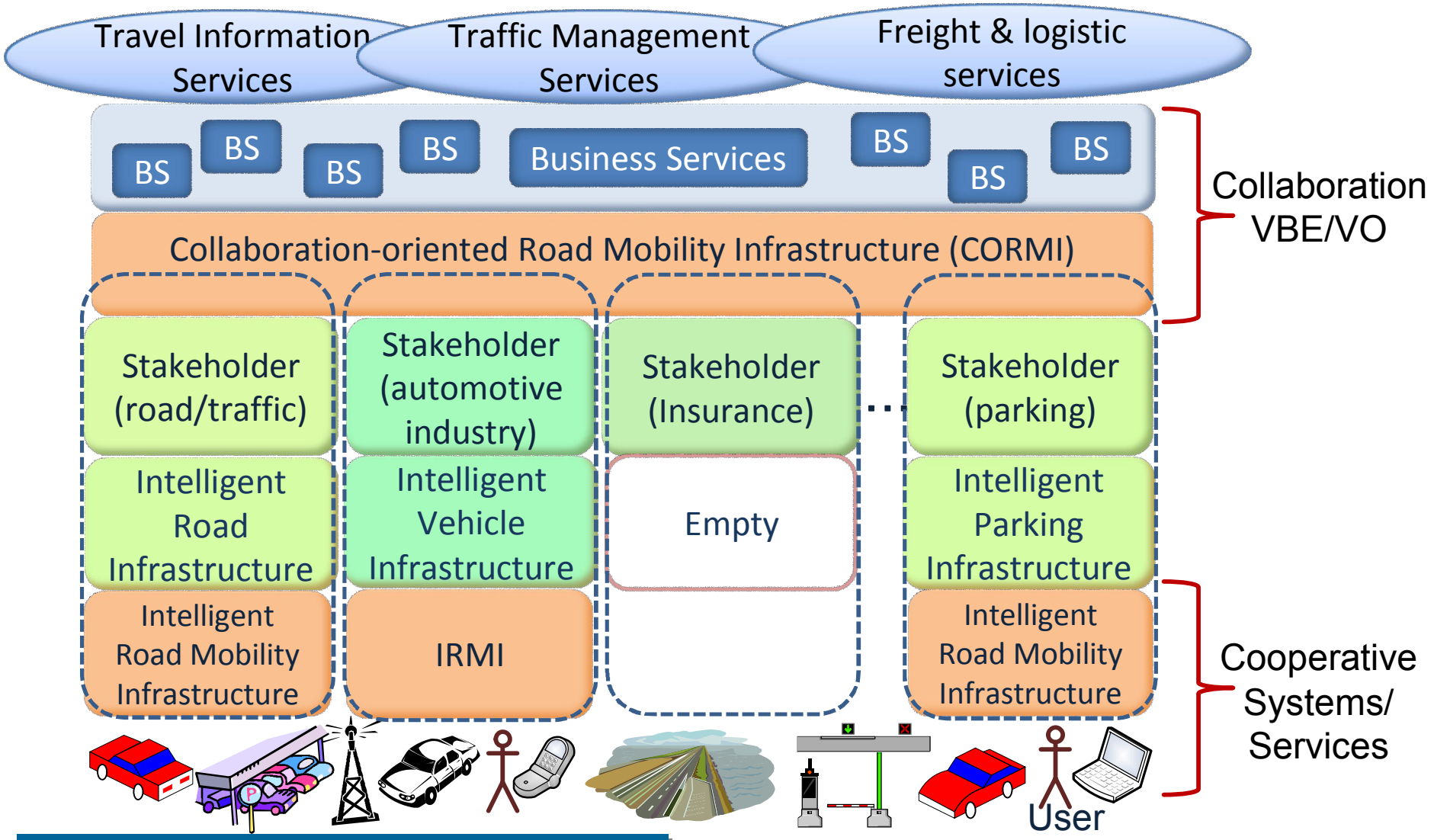
Integrated Business Services (IBS)



Integrated Business Services

- A Business Service (service required by a user or other business, supported by IT systems) requires a multidisciplinary approach - network of capabilities.
- Complexity, reutilization and reduction of operational risks, motivates the participation of more than one company in a given business opportunity (*Via-verde case*).
- An Integrated business Service is a service offered under a single contract while involving a network of specialized stakeholders.

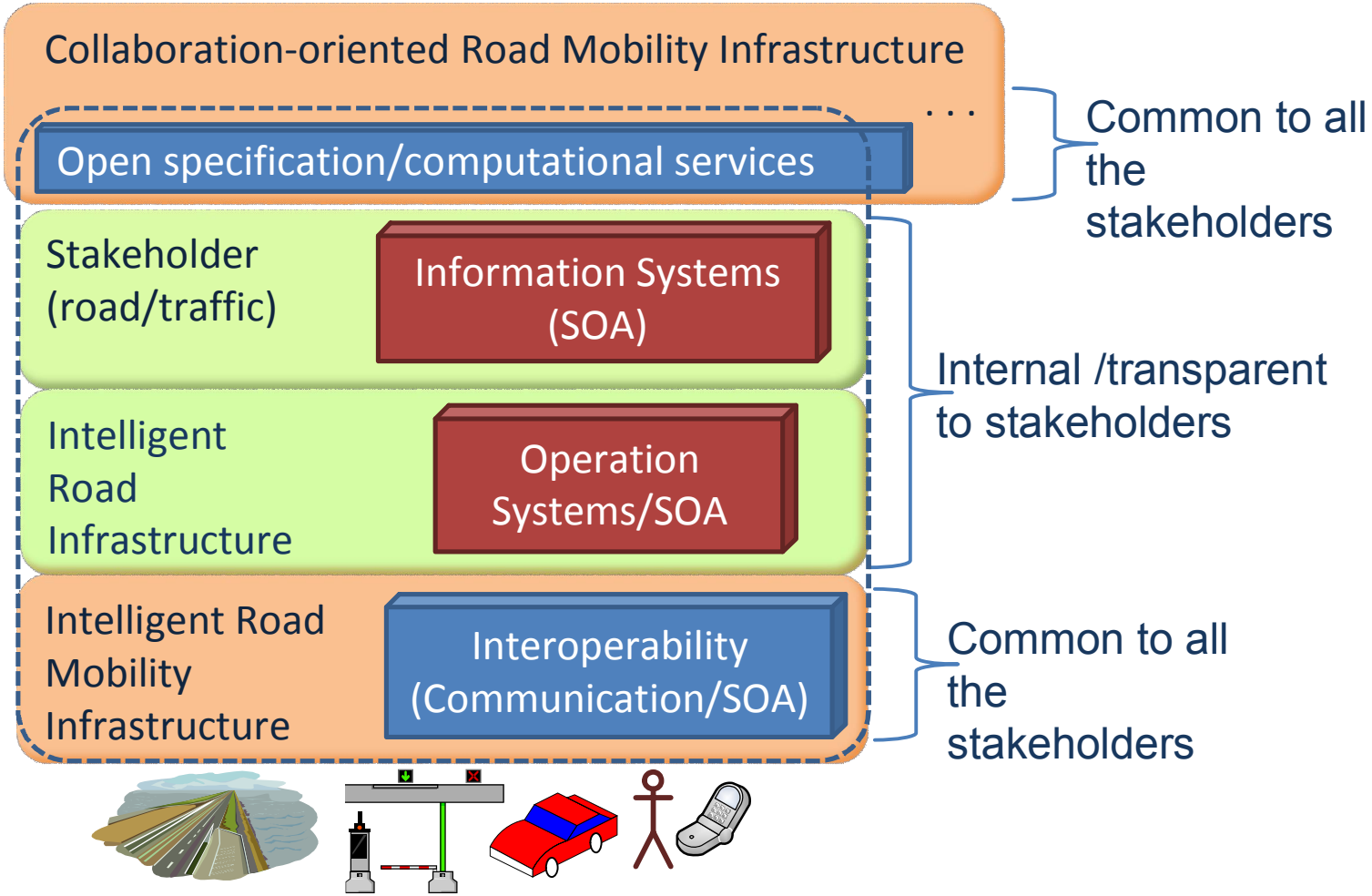
A strategy for mobility intelligent infrastructures



The two dimensions for Collaboration

- A group of organizations participating in IBS
  - A collaboration layer and a specialized CORMI open bus manages cooperative computational systems/services
  - This open collaboration layer (CL) establishes a virtual breeding environment (VBE) (preparedness)
- For the organizations needing to cooperate to nomadic entities (vehicles or nomadic devices)
  - A cooperative infrastructure (Cooperative Systems) implemented by the Intelligent Road Mobility Infrastructure (IRMI)

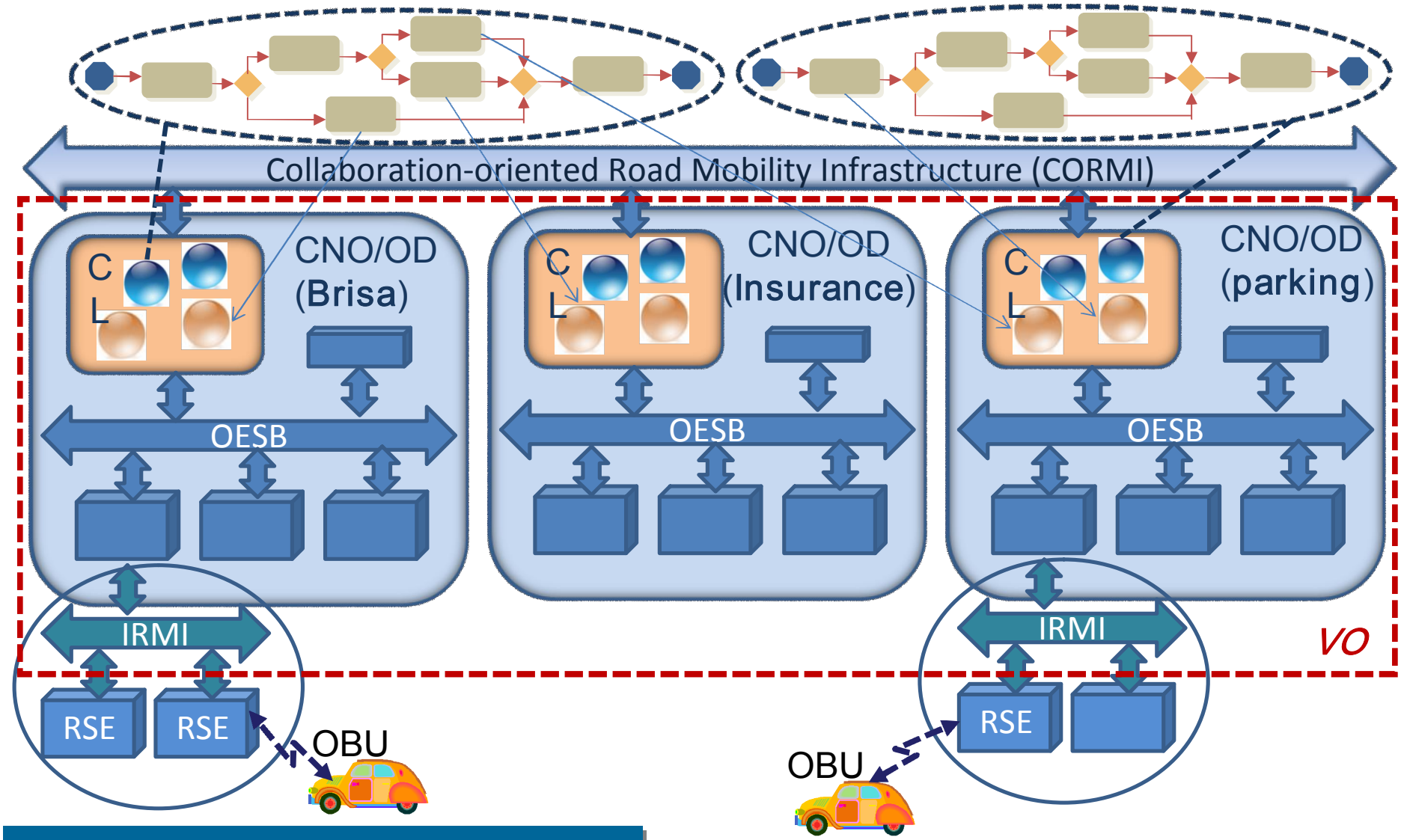
Architecture for a Participating Stakeholder



VO Participating Framework

- A collaboration layer (CL)
  - Collaboration-oriented Road Mobility Infrastructure
  - Open specification/computational services
- Information Systems (intra-stakeholder)
  - IT (road/traffic) (SOA)
- Operation Systems (intra-stakeholder)
  - Intelligent Road Infrastructure
- Intelligent Road Mobility Infrastructure
  - Interoperability (Communication/SOA)

Virtual Organization (VO) offering IBS



Collaboration Framework and Infrastructure

- Virtual Organizations (VO) offering a Integrated Business Services (IBS) establish a collaborative business processes space.
- Published services are implemented in the collaboration layer:
  - **System services**, part of a specific open collaboration bus (CORMI) and
  - **Application services**, not part of the CORMI.
- A VO establishes a set of collaboration processes, as a coordination of the participation of computational services from the participating organizations (through CL).

Conclusions

- Emergent mobility services requires the collaboration among business organizations
  - Transparency to location of persons associated to vehicles or nomadic devices
- Two dimensions approach
  - Participating organizations collaborate through a Collaboration Layer (CL) abstracting organization's cultural diversity
  - For the organizations managing physical infrastructures (roads, parking) an open service bus is proposed (open cooperative systems/services)