Profiling and Service Delivery in Internet-enabled Cars

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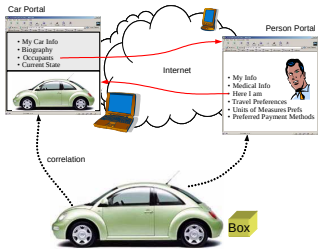
Databases and Distributed Systems Group &
Information Technology Transfer Office (ITO)
In Cooperation with HP German Innovation Center

Motivation

- Keep your environment with you
- Commuters
  - Try to avoid/reduce in-car dead time
- Get informed
  - (personalized) news, weather, ...
  - Read documents, e-mails, calendar, ...
- Location-based services
  - Hotels, restaurants, ...
  - Gas station, car repair shops, ...
- Personal preferences
  - System of Units
    - e.g. km or miles; liters or gallons; Celsius or Fahrenheit; ...
  - Language
  - Gas company

Vehicle Personalization Scenario

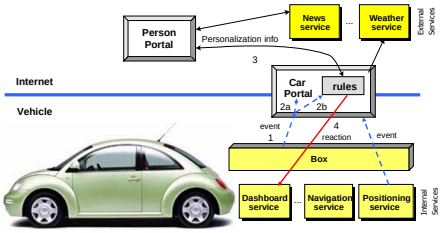


- Adjust vehicle instruments
- Apply personalization to other vehicles
- Apply personalization to services
- Interaction with internal & external services
- cooltown™ Model
  - Persons, things and places have a portal
- Useful for: car rental, road warriors, company cars, fleet management, ...

Enhancing cooltown™ Portals with Active Functionality

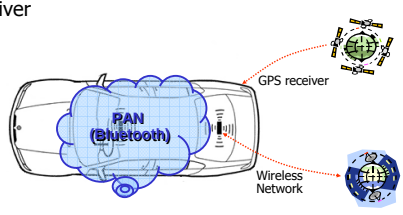
- Portals reflect current status of the entities they represent
- Status on portals is assumed to be maintained up-to-date
- Dissemination of events for updating portal status
  - as a collateral effect car manufacturer can directly subscribe to failures
- Why not react to these happenings?
- ECA-Rules: Powerful mechanism for customization!

Car Scenario + ECA Rules



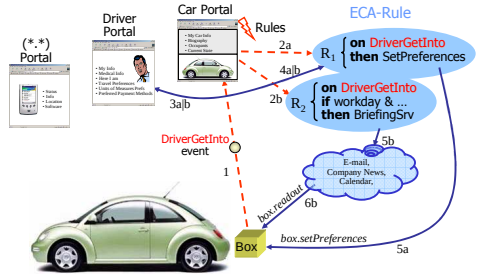
Scenario: In-Vehicle Infrastructure

- CarBox™ (computer)
  - Mediator between the car electronics and the external world
- Networking
  - Internal network (PAN: passengers & devices)
  - Connection w/Internet (Wireless Network: backend)
- Personal identification through cooltown™ beacons
- GPS receiver

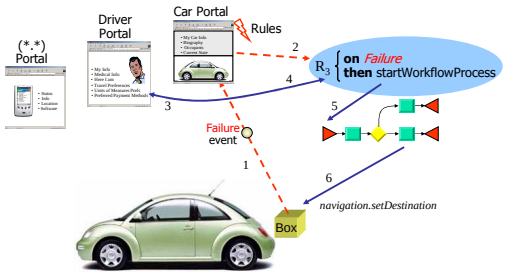


Car Rules - Examples

Preferences & Briefing



Failure



Ontology-based Infrastructure

- Ontologies/Common vocabularies
  - common interpretation basis for data and events
  - organized as infrastructure- and domain-specific ontologies
  - used for:
    - Infrastructure representation; rule representation; data integration; component/service interaction
- Active functionality service
  - Dynamic configuration
  - Hot definition of rules
- Interaction with external systems
  - event adapters
  - plug-ins
- Data integration
  - implicit modeling assumptions are made explicit (semantic context)
  - conversion functions
- High-level rule definition
  - context-sensitive conditions, actions, subscriptions
  - variety of rule definition interfaces Concept-based event dissemination
  - high-level subscription patterns
- Service-based architecture
  - flexible, extensible and powerful
  - centralized and distributed environments

Ongoing and Future Research

- Privacy and security
  - Who can read my profile? Access control strategies
  - Anonymity
  - Authentication
  - Data Encryption
- Multi-modal interfaces
  - Voice interaction (impact of environment changes)
  - Dashboard skins
- Remote diagnostics
- E-Commerce
  - Pay-per-use services (e.g. Insurance)
    - Payment infrastructure
- Analyze the impact of proactive dissemination
  - On-line statistics
    - Data mining algorithms to analyze failure patterns
  - Impact on supply-chain
  - Impact on vehicle features (design feedback)
  - New perspectives on e-Commerce applications

Summary

- Infrastructure for vehicle customization
- Personalization of instruments and services
- Interaction with internal & external services
- Customization applied to different vehicles
- Uniform use of portals
- Unified approach for representing objects