Profiling and Internet Connectivity in Automotive Environments

Mariano Cilia, Peer Hasselmeyer, Alex Buchmann
Databases and Distributed Systems Group
Darmstadt University of Technology, Germany
<lastname>@informatik.tu-darmstadt.de
Moving Active Functionality to Open Distributed Heterogeneous Environments

**Approach Taken**

- Homogeneous **Heterogeneous** environments
  - Ontology-based Infrastructure
- Centralized **Distributed** system
  - Concept-based Event Dissemination
- Database-hosted rules **Service-oriented architecture**
  - Rule Processing Chain (composition of services)

**Scenario:**

- Vehicle personalization by using ECA-Rules
Active Functionality Infrastructure (Summary)

- 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

- 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

- Interaction with external systems
  - event adapters
  - plug-ins

- Service-based architecture
  - flexible, extensible and powerful
  - centralized and distributed environments
  - Seems to be appropriate for modern global-scale applications
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
  - Portals reflect current status of their representatives
Car Scenario + ECA Rules

- Person Portal
- News service
- Weather service
- Internal Services
- External Services

Personalization info

Internet

Vehicle

Box

Dashboard service
Navigation service
Positioning service
Car Scenario - Rule Example

(*.*) Portal

Driver Portal

Car Portal

Rules

\{ on DrvGetInto then LoadPrefs \}

DriverGetInto event

Box

box.setInstruments
Prototype Details

- Ontology implementation (MIX Model)
  - Representation
  - ECA-Rule Infrastructure
  - Domain-specific: Car, Profile, Auctions
- Ontology implementation extended with active capabilities
- Portal (& Profile) Manager
- Event Adapters
- Plug-ins (Web Services, Workflow, ...)
- Elementary Services implemented
  - condition evaluation, filter, action execution, notification, timestamp, alarm, ontology server

- Web-Services implemented using EJBs
  - Weather, Text2Voice, Briefing

Software/Technology used
- Services on top of HP CSF
- HP Application Server
- Java implementation of the Ontology (MIX Model)
- Profile Mgmt. (CoolTown)
- HP Process Manager (Workflow)
- TIB/Rendezvous (event dissemination)