Title: Architecture vision for an Open Service Cloud for the smart car in logistics
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Content

• Overview of project oscar
• Open Service Cloud and Interfaces
• Secure “In Car” – App Framework
• Data collection and data profiles
• Use Cases
• Foresight use case in logistics
Overview of oscar

Smart Grid
- Smart Charging
- Roaming & Pay Off
- Energetic Recovery System
- ...

Smart Traffic
- Intermodale Traffic Administration
- Navigation/Routing
- Tourism
- ...

Smart Car
- ICT-Architecture (on-board power supply)
- Vehicle Interfaces, Human Machine Interface (HMI)
- ...

Standardised ICT-Interfaces

Cloud Gateway Server

Charging Points

Traffic sensor

Communication

e.g. Research Project "eConnect Germany"

e.g. Research Project "O(SC)^2ar"
OSC and Interfaces

- Open Cloud Service interacts with several Servers (Cloud Gateway Server, OEM Server, OBD Adapter) which are connected with the cars via UMTS (later LTE).
- The vehicles provide their data on a real-time basis.
- Business / Private Users can access the data on the Open Service Cloud and transmit data to the vehicles.
- Information Providers deliver additional environmental information and can get accumulated feedback of the car data (traffic, weather, etc.).
Secure „In Car“ – App Framework

Open Service Cloud

- Privacy Module
- Storage
- Public Interfaces

Vehicle

- Body Control Module
- Car2Cloud-Box
  - Data-Buffer
  - BUS-Security
  - Receive and Transmit
  - UMTS-Module
  - WiFi

Smart Phone

- App-Framework
- Vehicle-App
Data collection and data profiles

External Data Source

- DWD
- MDM
- eCar
- LISY

Open Service Cloud

- P1 Weather
- P2 Traffic
- P3 User
- P4 Route
- P5 Vehicle
- P6 Charging Station

Smart Charging Algorithm

L3 - Manipulative
(Feedback/Manipulation)
- special tools
- solution strategies
- optimised wayfinding

L2 - Advanced Prognosis
(connected)
- P3: authentication
- P4: calendar/destination
  → P1, P2

L1 - Simple Prognosis
(not connected)
- P5
- P3+P4 historically, resolved in time/date
- Reasoning

L0 - Real Time Tracking
(only car box information)
- State of Charge
- main consumption (engine) & ancillary consumption (heating, air conditioning)
Picture of First Demo
Possible - Use Cases

Energy Grid (NRG4Cast)
- Energy Demand Prognosis for electric vehicles

Third Party Applications (oscar)
- Secure framework for data access and data input of third party services.
- Secure framework for “In Car“-applications with limited vehicle control.
- Integration of external data input (Smart Grid, Smart Traffic, etc.).
- Additional control systems can be integration with the provided interfaces.

Fleet (oscar)
- Real time information of the vehicle state.
- Vehicle monitoring and maintenance for the OEM.
- Data profiles for third party services.

Sources of the pictures:
Use Cases – Logistics – Smart Logistic Grids

- Real Time Data Collection and aggregation to complex events, based on agile networks and intermodal supply network chains
- Supply chain operations room is a visualisation for all evaluated reactions to optimise the network.
- Target is the highest level of automation for executing the reactions, to optimise the network as fast as possible
Use Cases – Logistics - Preevaluation

Simulate scenarios
select reaction

State $x$ to Actual state $\alpha$
Possible states $\beta$
Probability of occurrence $p$
Target state $\gamma$
Reaction to achieve target state $m$

Zeit

Simulation
Digital Representation
Reality

State | Probability of occurrence | Reaction | Weighting factor | Evaluation $F(x,p,m,f)$
---|---|---|---|---
$\beta_2$ | $p_2$ | $m_{2-1}$ | $f_2$ | $F(\beta_2, p_2, m_{2-1}, f_2) = G_{2-1}$
$B_2$ | $p_2$ | $m_{2-2}$ | $f_2$ | $F(\beta_2, p_2, m_{2-2}, f_2) = G_{2-2}$

The reaction is selected according to its evaluated price $G$

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Conclusion

• Open architecture as basis for third party services and integration of several OEMs.
• Easy integration of additional sensorics and data.
• Accessability of data „In Car“, on external devices and for services via server access.
Thank you for your Attention!

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