Let Eclipse Chariott Massage You While Driving
SDV Community Day Lisbon – March 2023

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Mercedes-Benz Tech Innovation
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As a wholly owned subsidiary, we develop technological innovations, digital products and advanced software solutions exclusively for Mercedes-Benz. We drive the transformation towards "100% digital" while setting new standards in the context of car connectivity and the digitalization of vehicles and sales.
Background: Scrutinizing SDV Technologies in a Lab Environment

- Mercedes-Benz needed a test platform for validating various SDV technologies

- Example functionalities of interest:
  - Addition of new services after vehicle purchase
  - Dynamic re-allocation of software components to in-vehicle hardware
  - OTA

- Make those functionalities and SDV technologies come alive

- Early 2022: Searching for a representative example scenario
Predefined Massage Programs

- Multi contour seats come with adjustable integrated air chambers
- The dynamically inflatable air chambers can produce a massage function in different intensities
- Predefined massage programs define temporal and spatial sequences of air chamber inflation
- Some programs offer an additional warming effect ("hot stone massage")
High-Level Status Quo Architecture
Multi Contour Massage Seat (MCMS)

- The frontend (GUI) runs on the headunit and allows the driver to adjust the massage
- The MCMS is controlled by an ECU
- Compressed air is distributed to air chambers by Pneumatics Control
- The massage programs cannot be changed without flashing a seat's ECU
The Power of Decoupling Software and Hardware

Extraction of massage control logic from ECUs

Introduction of seat APIs

New use cases

Buy Massage
Create Massage
Dynamic Massage

...
PoC Extended High-Level Architecture Pre-Eclipse Chariott

Backend Massage-Controller

<<ECU>>

MCMS-IF

Vehicle Massage-Controller

MCMS-Headunit

MassageInterface

+ requestBubble()
+ createSequence()
+ updateSequence()
+ startSequence()
+ pauseSequence()
+ stopSequence()
Flow “Buy Massage“
Pre-Eclipse Chariott

1. orderMassage-Sequence
2. deliverMassage-Sequence
3. downloadSequence
4. downloadSequence
5. update
6. requestMassage
7. requestMassage
8. requestMassage
9. playMassage

Shop

Backend
Massage-Controller

<<ECU>>

MCMS-IF

Vehicle
Massage-Controller

MCMS-Headunit

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Evaluation of SDV Technologies

Techniques for Upgradeable Cars

• Enable continuous updates and upgrades of software functions
• Enable seamless relocation of functionality between vehicles and clouds
• Adopt developer-friendly tools and technologies

Chariott Opportunities

• Provide a service registry with lookup functionality
• Broker service-requests between providers and clients
• Provide event-streaming functionality
Evaluation Setup
Pre-Eclipse Chariott

- Vehicle Massage-Controller
- MCMS-Headunit
- MCMS-IF
- Massage-Mock

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Evaluation Setup
Architecture with Chariott

- Vehicle Massage-Controller
- Chariott Registry
- MCMS-Headunit
- Chariott Brokering
- MCMS-IF
- Chariott Streaming
- Massage-Mock
- Chariott Runtime

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Evaluation Setup

Chariott in Action
Code Demo
Conclusion

• Mercedes-Benz investigates SDV technologies in a lab environment
• Multi contour massage seats are used as a representative example scenario
• Extraction of massage control logic from ECUs and the introduction of seat APIs enable new use cases
• Service registries are essential building blocks for decoupling in-vehicle SW components
• Eclipse Chariott has proven useful and was successfully integrated in the example scenario
Flow “Dynamic Massage“
Pre-Eclipse Chariott

1. requestMusicWithMassage
2. requestMassageForMusic
3. requestMassageForMusic
4. playMusic
5. requestBubble
6. requestBubble
…
…

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