Lecture: Software-defined Vehicle
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Transformation of Mobility is our heartbeat
Global Trends revolutionizing E/E Vehicle Architecture

Automated Driving
Cloud Services
IoT
UX Applications
Shared Mobility

Cars with over-the-air capabilities by 2026
66% of OEMs plan to partner with software firms and system integrator firms
New vehicles based on common software platforms grow from 7% today to 35% by 2031
By 2031 software-based features and services will be a market worth $640 billion

36%
2026
+400%
$640 billion
The Software-defined Vehicle
Our Definition

In a Software-defined Vehicle, functions are enabled by software. Decoupling software from hardware enables swift and continuous development & implementation of new functions and software updates throughout vehicle lifetime.

The automobile, which until a few years ago was a self-contained system, has become part of a much more complex software-centric ecosystem – the IoT.

The focus is no longer only on hardware, which nevertheless has a significant importance, but more and more on software.
We Are Connecting The Dots
Experience software-driven future mobility

With our expertise across the entire ecosystem, we are the only one able to connect all the dots and provide dedicated solutions to support our customers, realize their vision.

* incl. Connected, Cyber Secured, OTA
We Are Connecting The Dots
Experience software-driven future mobility

I Manage and Scale
- Architecture
- Integration
- Industrialization
- Up-to-date*

II Safe
- No matter what, safety is not negotiable

III Exciting
- Drive the next generation of UX

IV Autonomous
- Relieved driving, efficient mobility

We address the market demands
The Smartphone on wheels
Industry Needs realized by the SW defined vehicle

We connect the dots
From the concrete to the cloud

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The Software-defined Vehicle
What to accomplish with the Software-defined Vehicle?

Manage and Scale

- Continuously field data inflow to improve algorithm & product
- Reduce test effort and time on the road by >50%
- “Code to road” within 1 day

Service-Oriented Architecture

New business models
Data-driven development
Virtual development
Software separation from hardware
Shorter development, test and integration cycles
Shorter time to market

Digital Lifecycle

RFQ
SOP
EOP
EOL

Software as a Product, or Service (SaaS) business models

New platform SOP < 1 year
New vehicle SOP < 2 months

Open architecture for 3rd party software

Scalable Compute Platform

Cloud Services

Continental HPC Platform

Data Center

Continuously field data inflow to improve algorithm & product

Reduce test effort and time on the road by >50%

“Code to road” within 1 day

Continental
Manage and Scale

Public Cloud

From the road to the cloud

OS/Middleware

Server/Zone Architecture

Components/Solutions

SW/HW Separation

Connectivity

Virtualization/Digital Twin

Integration

Continuous Testing, Validation/Development

Cyber Security

Lifecycle Management

OTA Update/Upgrade

From virtual to real

Actuators

ZCU

HPCs

Display

Sensors

Antenna
New Architecture with Introduction of HPCs
A radical shift in the automotive industry

*HPC: High-Performance Computer*
Plug & Play HPC and Fluid Cooling Solution
Flexible and scalable concept

Manage and Scale

Housing Solutions
- Modular family concept
- Scalable for one up to four modules
- Electrical interconnection between the modules
- Integrated fluid cooling

Cooling Solutions
- Different cooling solutions
- NEW: flexible fluid cooling pad
  - No TIM* foil necessary
  - Easy module exchange in service garage

*TIM: Thermal Interface Material
**Use Case**

**Holistic Motion Control**

### Benefits & Features

- **Scalable**
  SW product to match stakeholder needs and interfaces

- **Configurable**
  Main- or fallback path for all driving functions

- **Host independent**
  Application SW as a Product

- **Harmonization**
  Between all driving use cases with integrated stability support

- **Reduced verification**
  No sequential application

- **Smart centralized control allocation**
  Orchestrates all motion actuators

- **Enables actuator redundancy**

- **Realizes OEM specific DNA**

- **Supports energy efficient approach**

- **Optimized for all driving functions**

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**Logical architecture**

- Safety and Stability
- Manual Driving
- Assisted & Automated Driving
- Selective Driving DNA

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**III Exciting**

**Holistic Motion Control Software**

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**II Safe**

**Driving Functions**

- Smart Sensors
- Driving Function Interfaces
- Vehicle Dynamics
- Chassis Dynamics

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**I Safe**

**II Safe**

**Driving Functions**

- Safety and Stability
- Manual Driving
- Assisted & Automated Driving
- Selective Driving DNA
Use Case
Driver Identification Display

Convenient, touchless and secure solution for driver authentication and mobile payment.
Use Case
SHM AFEELA

Elektrobit software, services and expertise helped industry newcomer SHM Sony Honda Mobility to realize the innovative AFEELA prototype.

Cockpit computers and displays powered by Elektrobit software and integrated by Elektrobit engineering services enable unique, next-gen mobility experience.

Partnership flips the script on traditional vehicle creation, with software as “the starting point” of development.
Use Case
Aurora System Setup

1x Top Sensor Module
- With the unique Aurora lidar industrialized by Continental, and a combination of long range imaging radars and cameras from Continental’s portfolio

2x Side Sensor Module
- Combination of long range imaging radars, far looking cameras and mid-range lidar sensors

Automated Driving Control Units
- 4 Layers of Automated Driving Control Units ranging from main compute (high performance) to basic vehicle controls

3x Sensor module low range
- Combination of surround range radars, narrow and wide view cameras from the Continental portfolio and near-range lidar

ALL SENSOR MODULES FEATURE
- Cleaning
- Sensor heating
- Wire harness with central connector
- Easy to maintain and replace