



# Capital Market Days 2020

## Strategic Action Field: Software and Systems Excellence

### Our Strengths Overcome Software Challenges

Ticker: CON  
ADR-Ticker: CTTAY  
<http://www.continental-ir.com>

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# Strategic Action Field: Software and Systems Excellence

Our Strengths Overcome Software Challenges



Autonomous  
mobility



Smart  
mobility



User  
experience



Safety



Software and systems excellence



Architecture and networking

# Did You Know That ...

... Continental performs  
**>250 software builds** for existing  
customers/projects per day

... Continental has equipped  
**1,000,000,000+** cars with  
software



... Continental has had its  
own dedicated **Software  
Academy since 2019**

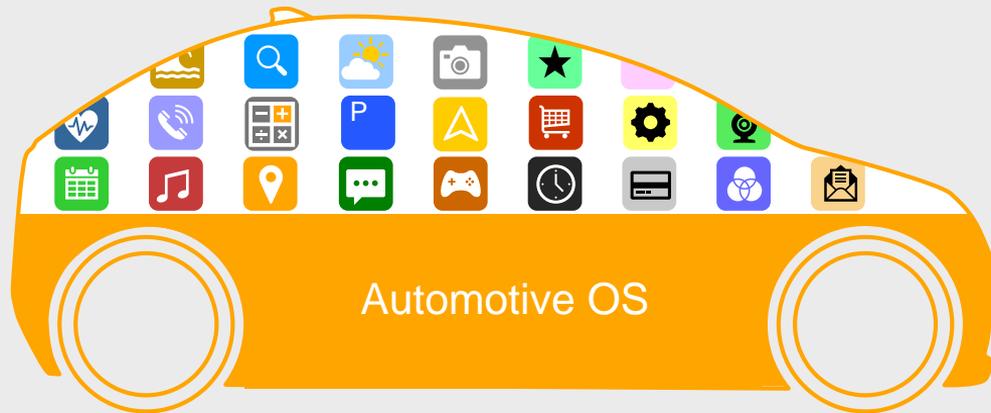
# Software-defined Vehicles

## ... Face Numerous Challenges



1 microprocessor  
1 display  
1 OS  
7 sensors  
0.174 kg  
0 km/h

Faulty software is **annoying**



100 microcontrollers  
4 displays  
4 OS  
hundreds of sensors  
1,995 kg  
250 km/h<sup>1</sup>

Faulty software **can be fatal**

<sup>1</sup> Reference vehicle: German premium class vehicle in 2020

# Software-defined Vehicles

## ... Face Numerous Challenges



### Explosion of complexity

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- › Customer expectations and regulatory requirements
- › SW-defined differentiation



### High degree of variants

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- › Regional requirements
- › Numerous models per OEM
- › Highly customizable models



### Long product lifetimes

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- › Long-term maintenance period
- › Always up-to-date, safe and secure



### Vague standards

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- › Generic industry standards
- › OEMs interpret standards individually



### Safety

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- › Safety-critical mission
- › Defects can be life-threatening

# Our Strengths Overcome Software Challenges

## We Cover the Entire Spectrum of Customer Needs

**60%**

**Non-differentiating software**

- › Common functionality required of all vehicles, regardless of brand, OEM, trim level, etc.
- › **Customer needs:**  
Economies of scale for most competitive cost position



**40%**

**Differentiating software**

- › Unique functionality for specific OEMs, models, regions, customer groups, etc.
- › **Customer needs:**  
Economies of scope to provide best support/expertise

Continental offers best-in-class  
**software and systems  
excellence** based on:



Competence



Technology



Workflow

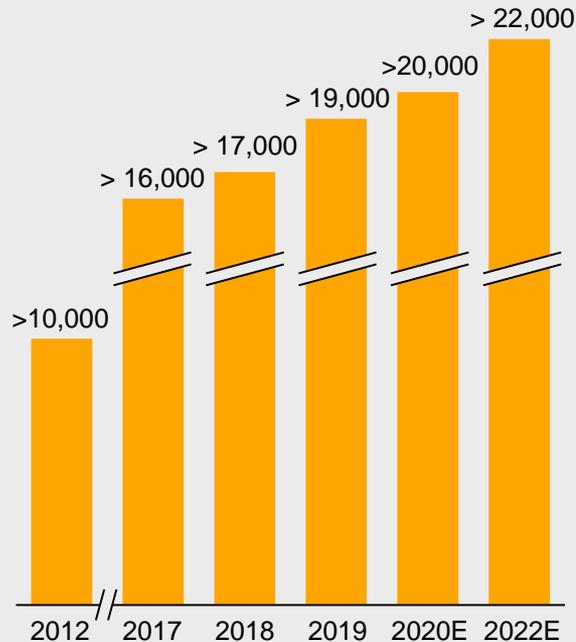


Collaboration

# Software Experts in Every Field

Continuously Improving with New Specialist Staff, Acquisitions and Training

## Number of software and IT specialists



## Software-related acquisitions

- 2015  Elektrobit

Expanded software and systems expertise
- 2016  ZONAR

Access to fleet management market
- 2017  ARGUS  
CYBER SECURITY

Leading automotive cyber security expertise

## In-house Software Academy

### Boost software expertise

- › **Effective on-boarding** new hires
- › **Systematic up-skilling** to new technologies
- › **Extensive cross-skilling** non-software engineers on software topics

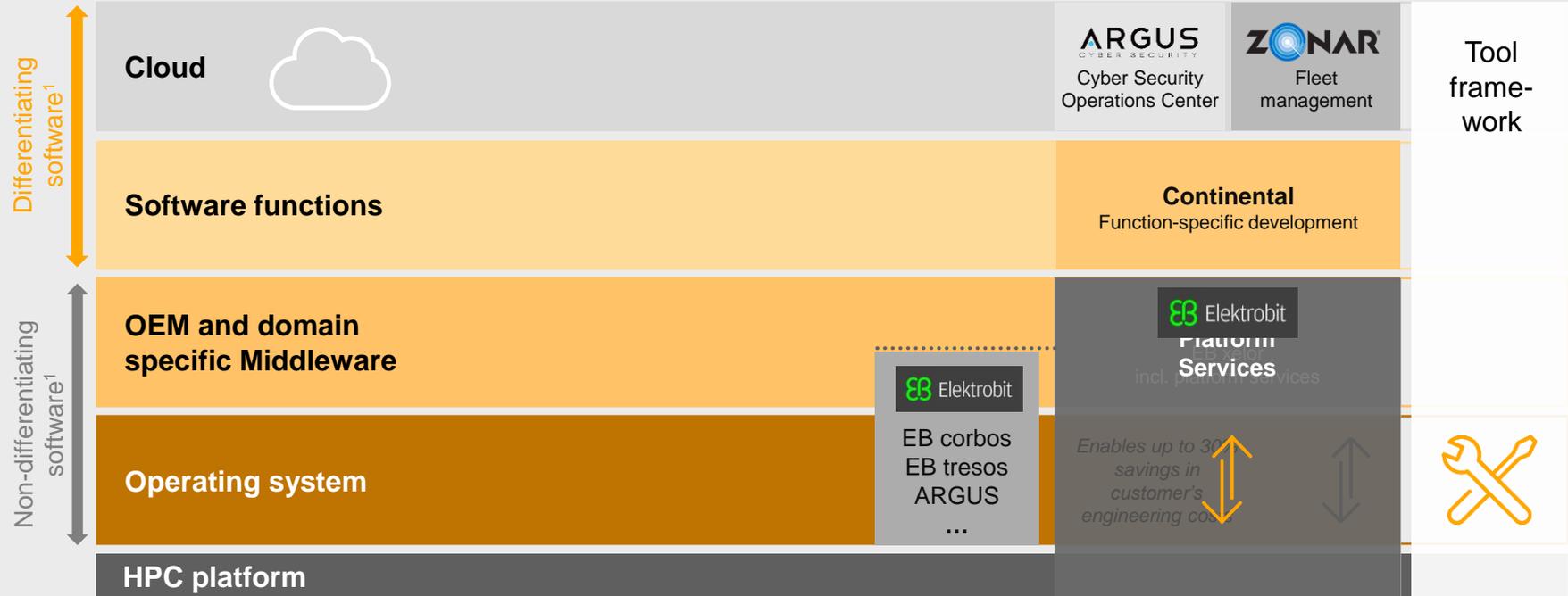
### State-of-the-art learning

- › **+319% YoY** completed learning items
- › **Agile:** +100 training units added in 2020
- › **Artificial Intelligence:** ~1,900 employees with knowledge in the area of AI by 2022
- › **Cyber security:** 20k+ training units attended
- › **New formats:** Hackathons, hands-on,...

# Scalable, Integrated and Cloud-ready Platforms

We Deliver Software Stacks for Present and Future Architectures

## Continental's Technologies

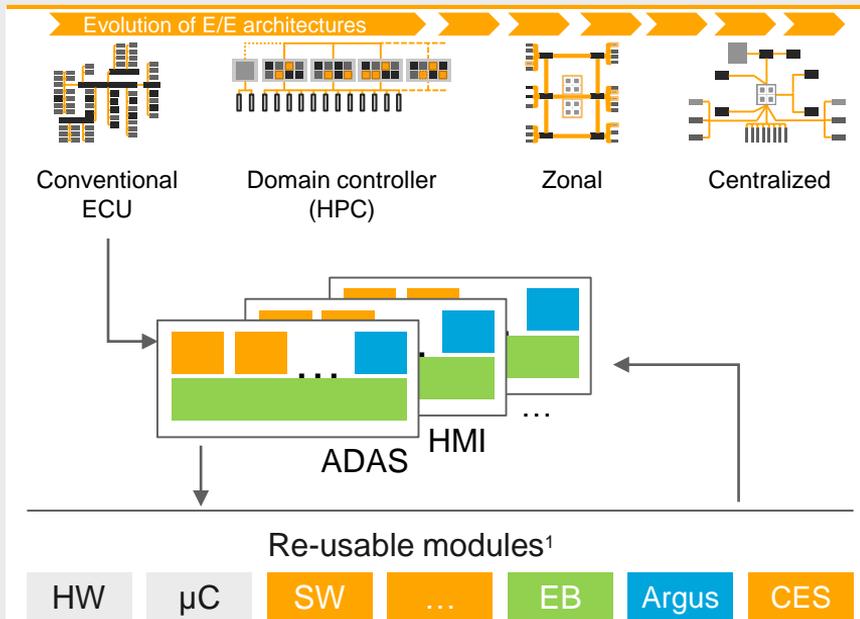


<sup>1</sup> Differentiating and non-differentiating software from an OEM point of view

# Scalable, Integrated and Cloud-ready Platforms

Our Products Fit into Today's and Future E/E Architectures

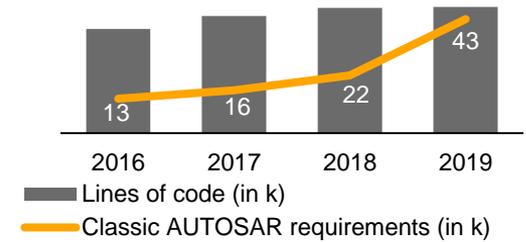
Re-usable product architecture to deal with complexity and transition



<sup>1</sup> HW: Hardware, µC: Microcontroller, SW: Software, EB: Elektrotbit, CES: Continental Engineering Services

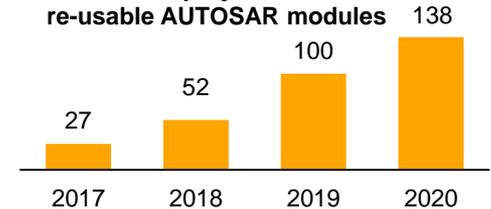
We continuously enhance our platform products and increase the richness of functionality

Efficiency to deal with complexity



Re-usable platforms applied across numerous customer projects

Continental projects based on re-usable AUTOSAR modules



# Speed and Agility

We Have Efficient Software Development in Place

Fast and regular deliveries without compromising on quality

From projects ...



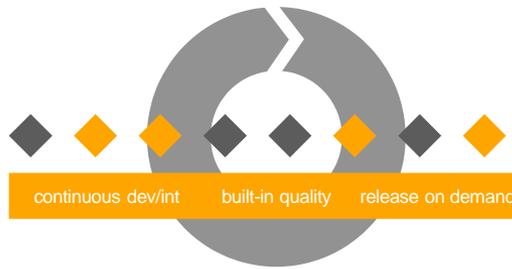
set-up development validation release maintenance

Classical project set-up with  
**V-model**

6 months iteration



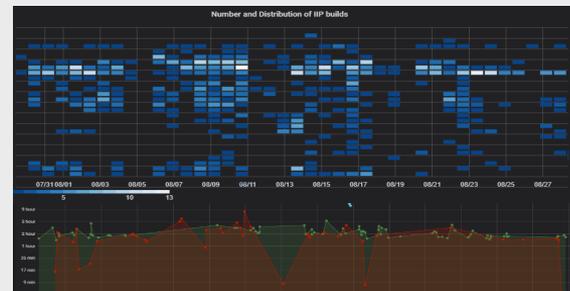
... to flow development



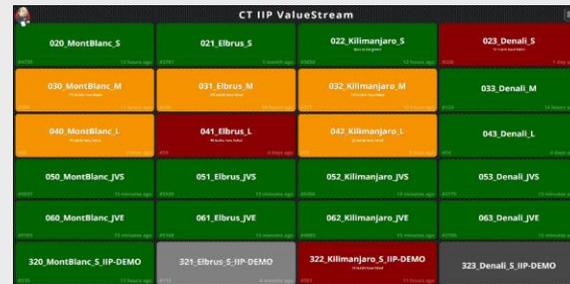
continuous dev/int built-in quality release on demand

State-of-the-art  
**flow development**

2 – 4 weeks iteration



250 software builds per week for IIP<sup>1</sup> project



70k tests executed/week

<sup>1</sup> IIP: Integrated Interior Platform

# Speed and Agility

## We Manage the Complexity of Software Integration End2End



### Continental software factory

- > Continuous integration, testing and delivery
- > On-site and cloud resources
- > Embedded hardware



Software delivery  
KPI reports



### Continental Cooperation Portal



Real-time traceability  
feature requests | bug  
reports | software



### External software factories

OEMs and partners



Solution to integrate an exponentially growing amount of software



Automatization and standardization

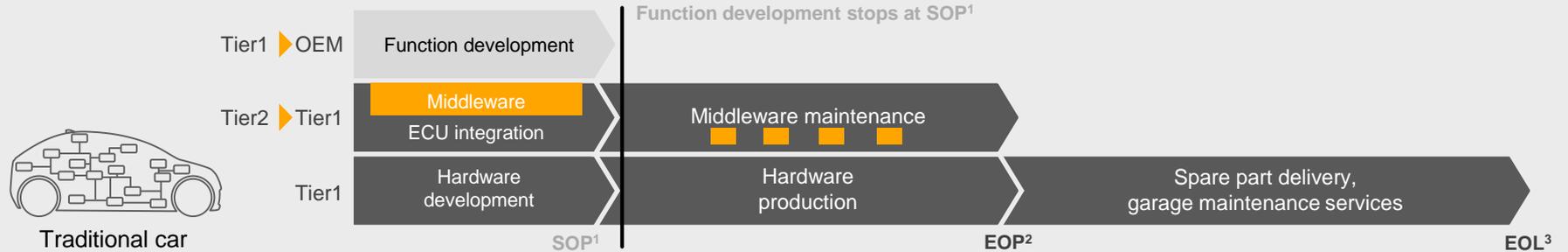


Reduction in development time and costs, increase in software quality

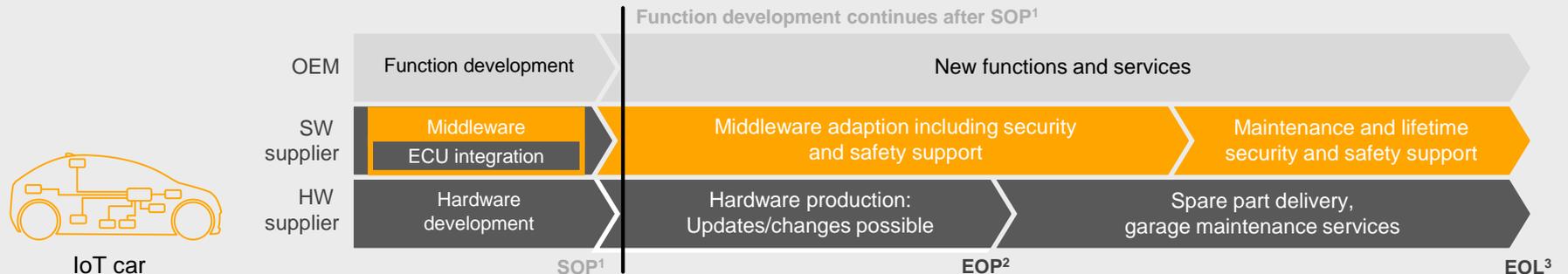
# Collaborations Based on Trust

## Software-defined Vehicles Require a New Collaboration Model

### Hardware and function coupling – Software treated like hardware



### Software-defined vehicle needs a software platform partner throughout vehicle lifecycle



<sup>1</sup> SOP: Start of production, <sup>2</sup> EOP: End of production, <sup>3</sup> EOL: End of life

# Collaborations Based on Trust

## Our Strong Partnerships Within the Ecosystem

Technology

**SUSE** **QNX**  
 Dassault Systemes | HPE  
 Pioneer | Sennheiser | Synopsys  
 Ansys | dSPACE | SIEMENS  
 IBM



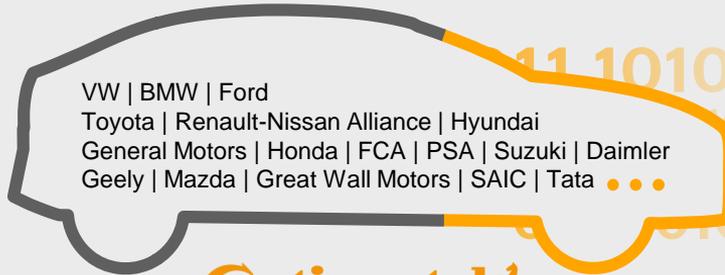
Consortia

**AUTOSAR**  
 ADASIS | SENSORIS | ELISA  
 Navigation Data Standard | VDA  
 AUTOMOTIVE GRADE LINUX  
 VDA | TISA | ASAM | ZVEI  
 Safety Pool



Semiconductors

**RENESAS** **Infineon** **NXP**  
 NVIDIA | Qualcomm | arm  
 HUAWEI | Intel | SAMSUNG  
 STMicroelectronics



VW | BMW | Ford  
 Toyota | Renault-Nissan Alliance | Hyundai  
 General Motors | Honda | FCA | PSA | Suzuki | Daimler  
 Geely | Mazda | Great Wall Motors | SAIC | Tata



**We unite the right partners for building software-defined cars.**



**amazon** **here**

Telekom | Microsoft  
 Google | Baidu百度 | apollo  
 vodafone | TomTom | Equinix



# Software and Systems Excellence

## Summary



**First supplier** in the automotive industry to enable **software-defined vehicles** (Volkswagen ID.3)

We cover **100%** of customers' software needs, **from non-differentiating to differentiating software**

We have a **strong software team**, continuously growing with new specialist staff, acquisitions and training

Our **technologies and workflows** enable efficient and agile development of **full software stacks**

**Proven collaboration model** that brings together OEMs, hardware and software suppliers, and services providers

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# Continental

The Future in Motion