



The Software Defined Vehicle and Its Effects on Vehicle Architecture

Smart Diaspora 2023, Timișoara/Temeswar 12th April 2023

Dr.-Ing. Christian v. Albrichsfeld, Country Head Continental Romania, R&D Head

Continental Group

Leading the Way for Your Mobility



A leading player
in **autonomous
mobility**

First to market
with **software-
defined**
vehicle architecture

Industry-
benchmark
operational efficiency
in **tires**

190,875
talented and
dedicated
employees

Continental Group

Overview 2021¹



33.8 billion
in **Sales**

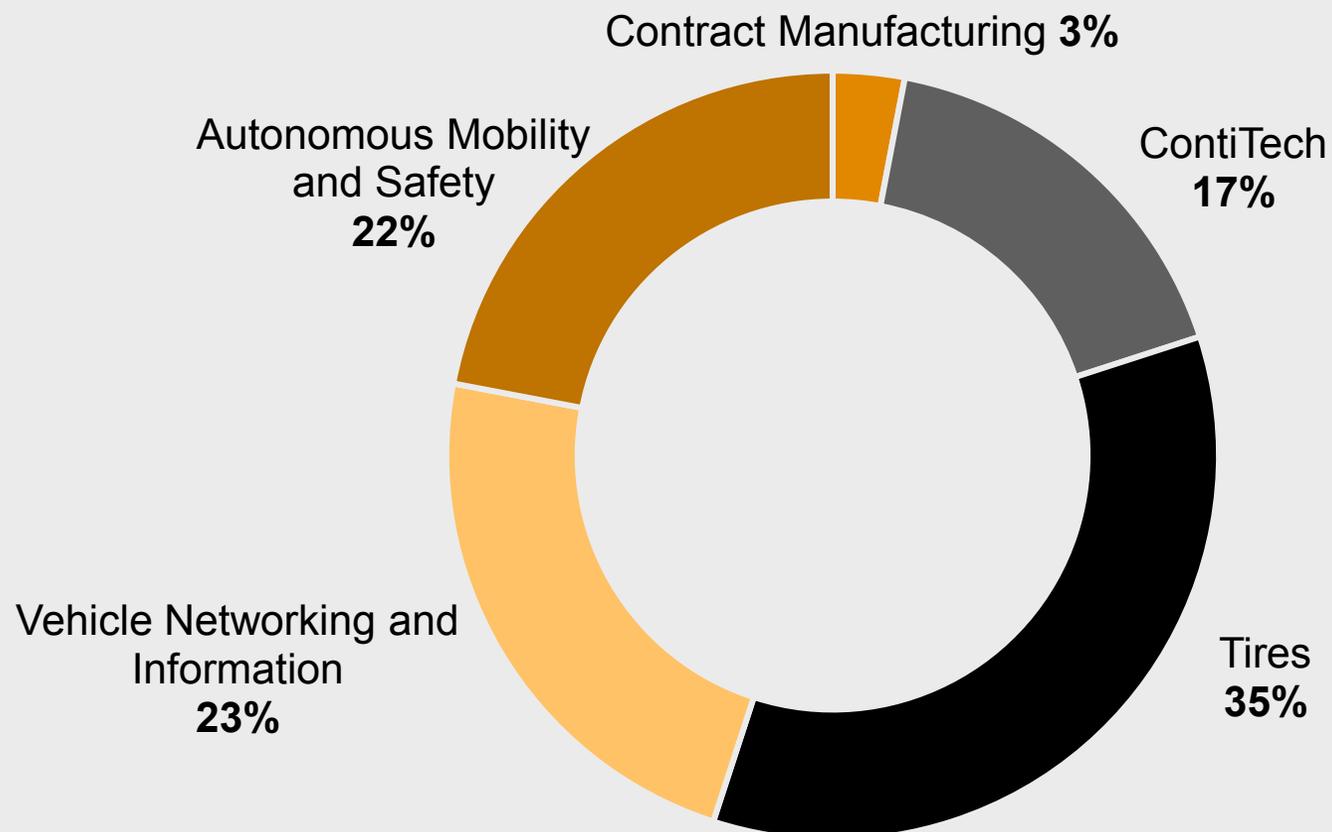


190,875
employees



527 sites
in 58 countries

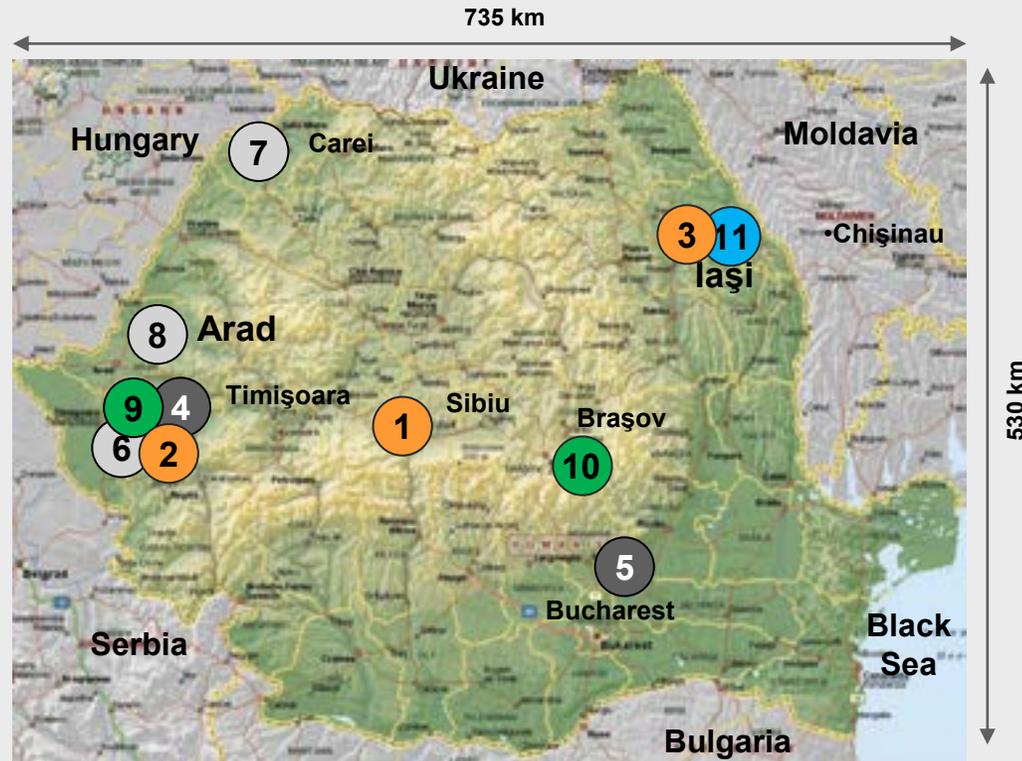
Sales by Group Sector in %



¹ IFRS 5 has been adopted for Vitesco Technologies since 2021.

Introduction: Continental in Romania

December 2022, HC over 19.000, ~2.2 bn € Investment



- 1 — 3 Continental Automotive
- 4 — 5 Continental Tires
- 6 — 8 Continental Contitech
- 9 — 10 Elektrobit
- 11 Continental Lightning

- › 8 legal entities in 11 locations.
- › 6 production units and 4 R&D centers
- › All 3 group sectors in Romania

Continental

- › Top products & technologies, Digitalization
- › Top employer
- › Top investor
- › Top citizen of the community

People

- › >19.000* employees
- › > 8.000 employees in R&D and Global Service

* Including leased variable employees



Digitalization



Sustainability

Our Challenges and Opportunities



Technology Shift



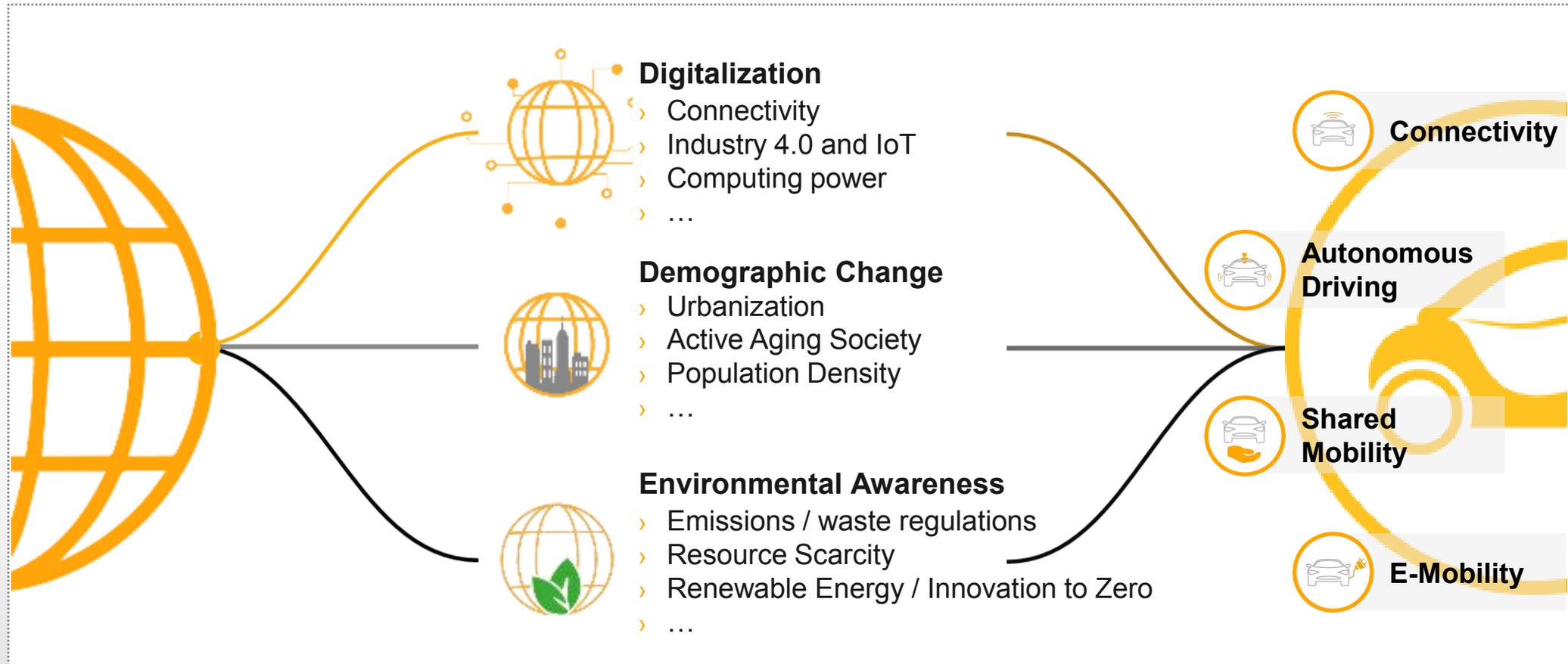
Competitive Environment



Speed

Trends and their Impact on Future Mobility

Trends will lead to Disruptive Changes in Mobility



Urbanization

Some Facts



3,200+ people

More than 3,200 people die each day by urban air pollution.



95%

Today's cars are parked 95% of the time. Only 5% are in use.



65%

Today, 65 percent of all travel kilometers are made in urban areas. This number is about to triple by 2050.



80%

Cities produce 80 percent of the global greenhouse gas emissions and consume 75 percent of the natural resources.



100%

In average the commuting time doubles during rush hour in megacities.



41

Today, there are 28 megacities. This number will increase to 41 by 2030.

Data Source: WHO, UN European Environment Agency

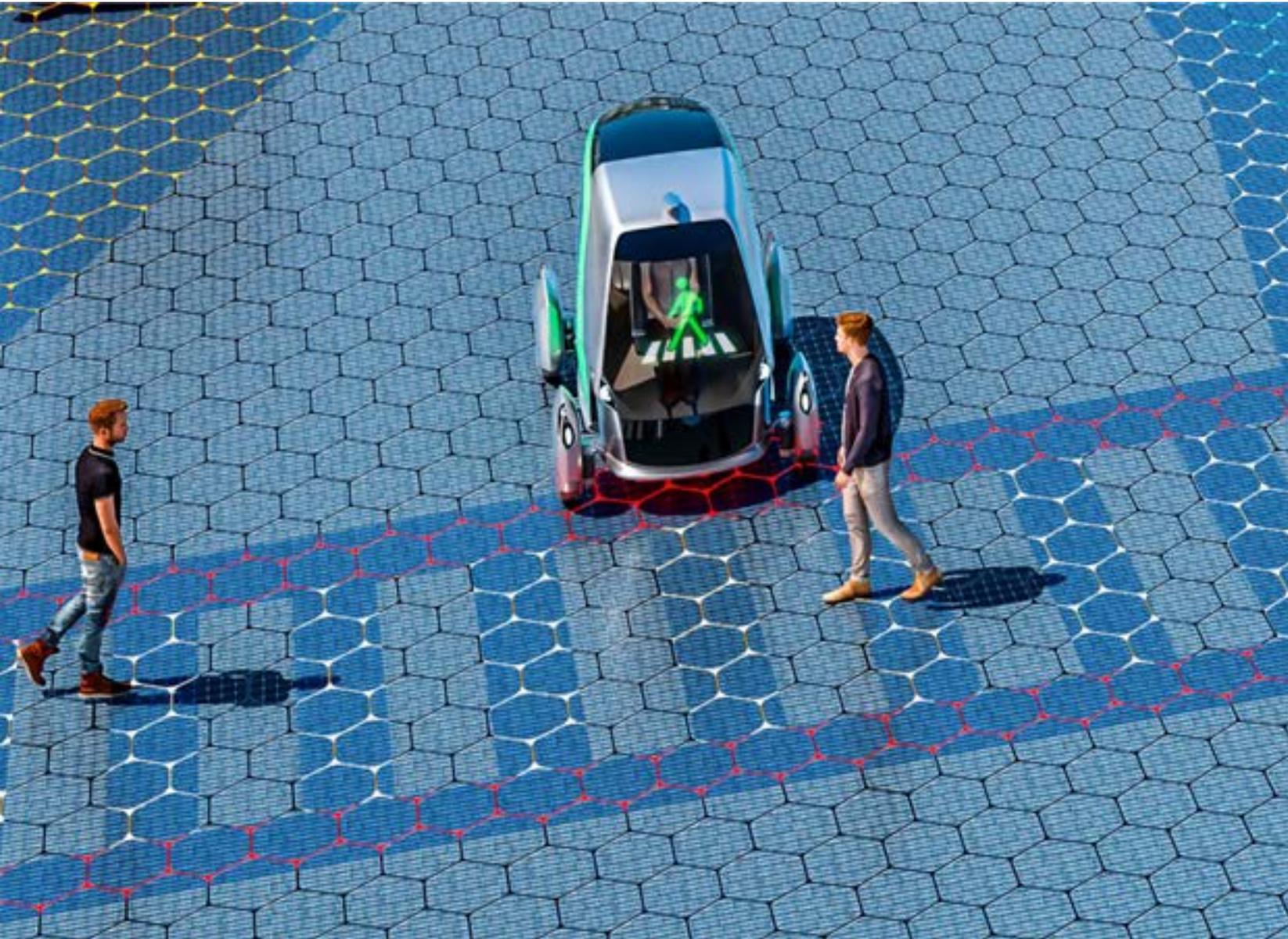
Continental Future Perspective

Our vision for tomorrow

1. Electric Vehicles & Charging
2. Autonomous Driving
3. Shared Seamless Mobility
4. Last-mile Delivery
5. Connectivity Solutions
6. Intelligent Intersections
7. Commercial Vehicles: Platooning
8. Off-Highway: Agriculture
9. Railway + Public Transportation



2 Autonomous Driving



- › **Today's ADAS** provide basis for automated driving
- › **Automation** brings more **safety, comfort, convenience, efficiency**
- › New **sensor** technologies, **high-performance computer** systems
- › **Sensor fusion, environment model**
- › **Cluster intelligence** formed from the connected vehicle fleets
- › **Human-machine dialogue** with new components and solutions

Shared Seamless Mobility



- › **Seamless mobility journey:** Safe, easy, stress-free and environment-friendly trip
- › Convenient integration of **mobility offerings**
- › **Mobility hubs** and transport networks
- › **Mobility-as-Service (MaaS)** as one digital platform
- › **Shared mobility solutions**

4

Last-mile Delivery



- › Growing & dynamic market, driven by increasing e-commerce sales
- › **Automated goods delivery up to 80% of all B2C deliveries**
- › **Seamless & efficient** goods delivery with the help of **delivery robots** and **driverless vehicles**
- › Utilization of transport capacity and **reduction idle times**
- › Transfer and scale automotive technology

Safe Urban Public Transport

Cross technology solutions to increase the safety level



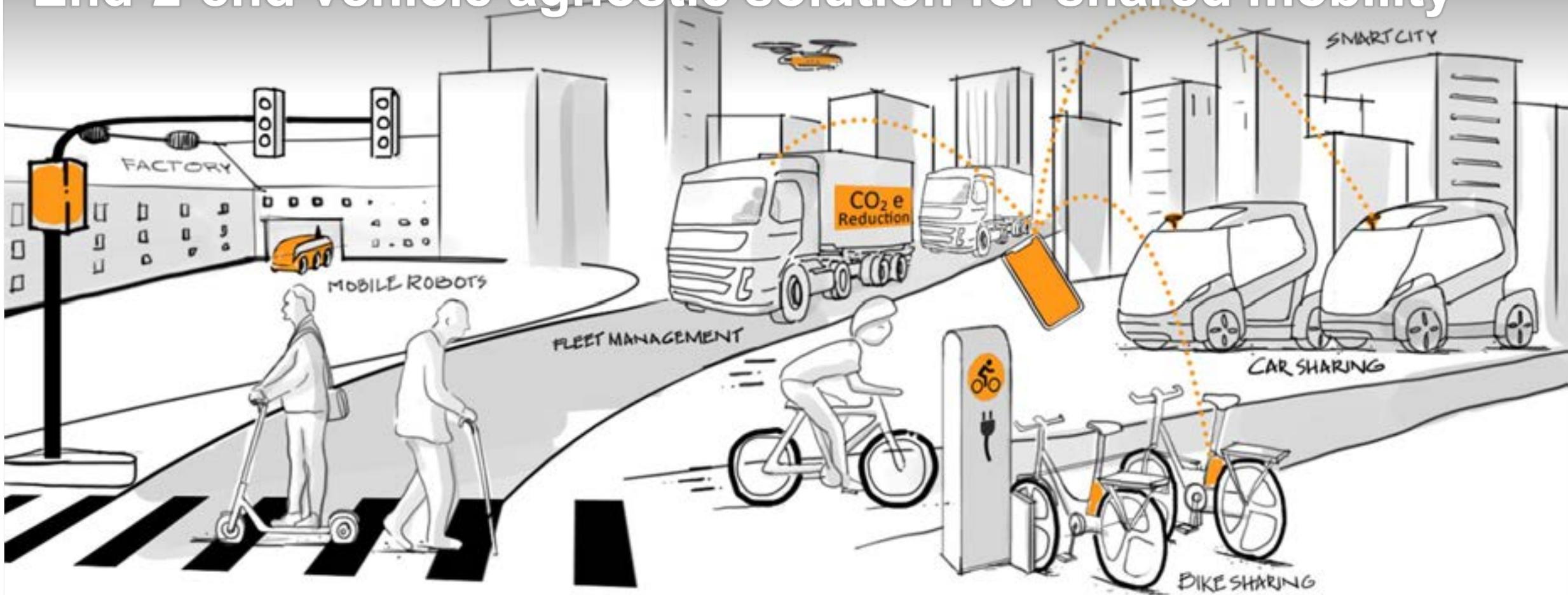
Safe Urban Public Transport

Cross technology solutions to increase the safety level



MaaS Digital Services Platform

End-2-end vehicle agnostic solution for shared mobility



Connect and manage your fleet with just one platform, independent of your vehicle(s).

MaaS Digital Services Platform

- › Empower your vehicle fleets with our **digital services** to create a seamless experience for your **end customers** as well as **sharing, fleet & logistics operators**
- › **Flexibility to connect all kind of vehicles**
- › High scalability, End-to-end solution (one interface along the service chain)
- › **One-stop-shop solution for shared mobility**
- › Serving today and tomorrow`s business models (pay-per-use, pay-per-mile, etc.)



MaaS Digital Services Platform

System Components

3 Digital Services

Vehicle Monitoring & Control

- › Live Location
- › Riding/Trip History
- › Vehicle Diagnostics
- › State of Charge
- › Charging Alert
- › OTA SW Update (HW)
- › Lock Control
- › Service Alert
- › Key as a Service

Sharing & Fleet Operations

- › Device Manager
- › Location & Geo Manager
- › User Registration & Mgt
- › Booking Manager
- › Damage Report
- › Feedback Manager
- › B2B Interface
- › Rights Manager
- › Smart Booking

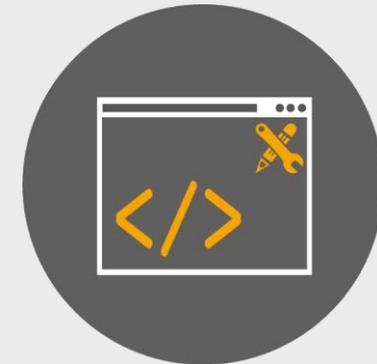
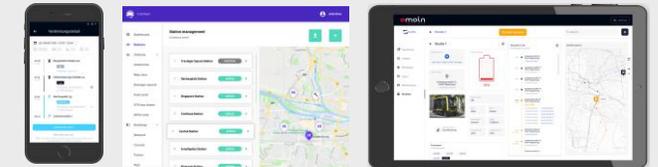
Customized Services

- › Driver Monitoring
- › Anti-theft
- › Range Prediction
- › Predictive Maintenance
- › OBD Vehicle Diagnostics
- › OTA SW Update (Drivetrain)
- › Drive Mode Setting (speed limit)
- › Service Alerts (OBD)
- › Damage Alerts (OBD)
- › Garage Finder

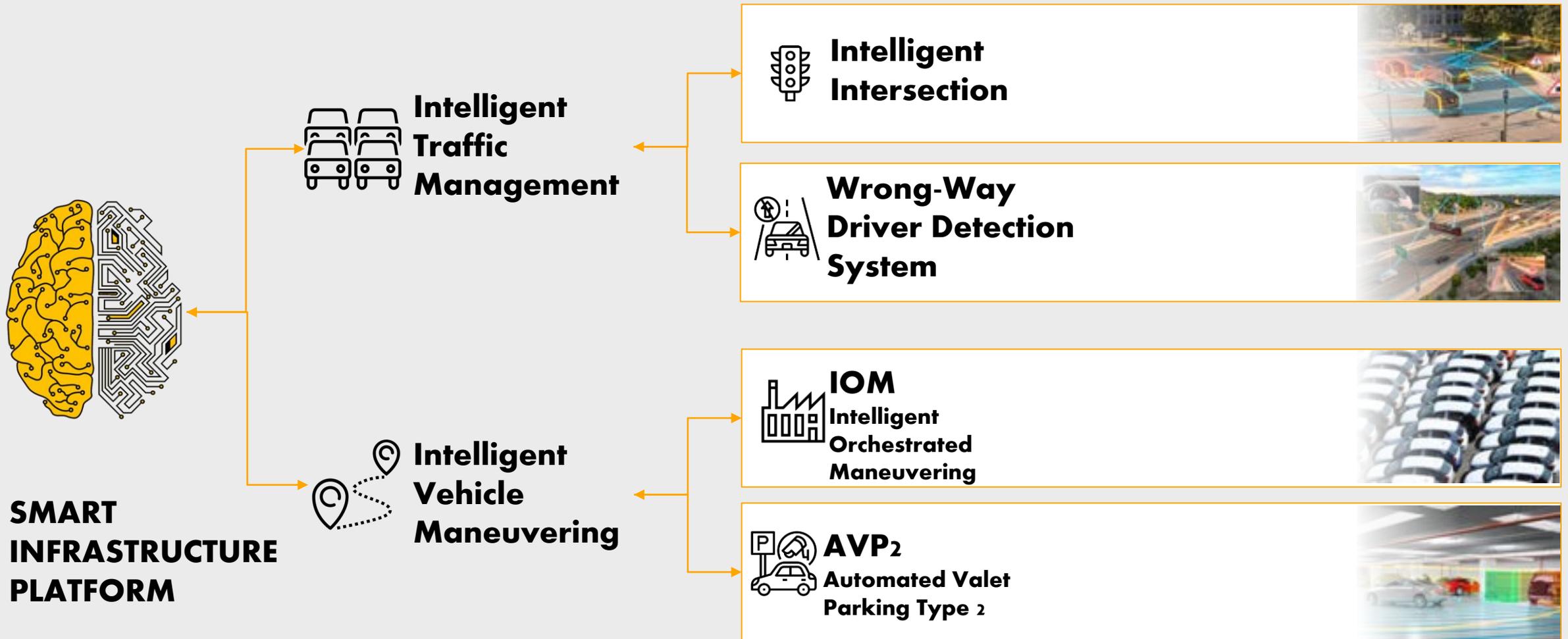


4 Frontend Services

- › Customer branded App(s)
- › Operator Dashboard(s)
- › APIs for Sharing
- › APIs for Fleet and Logistics operations
- › Call-Center upon request
- › Service Level Management



Smart Traffic Infrastructure System: Platform Approach



Smart Traffic Infrastructure System

Intelligent Intersections: increase urban safety & efficiency

Safety

Enhance traffic safety for all road users by V2X communication

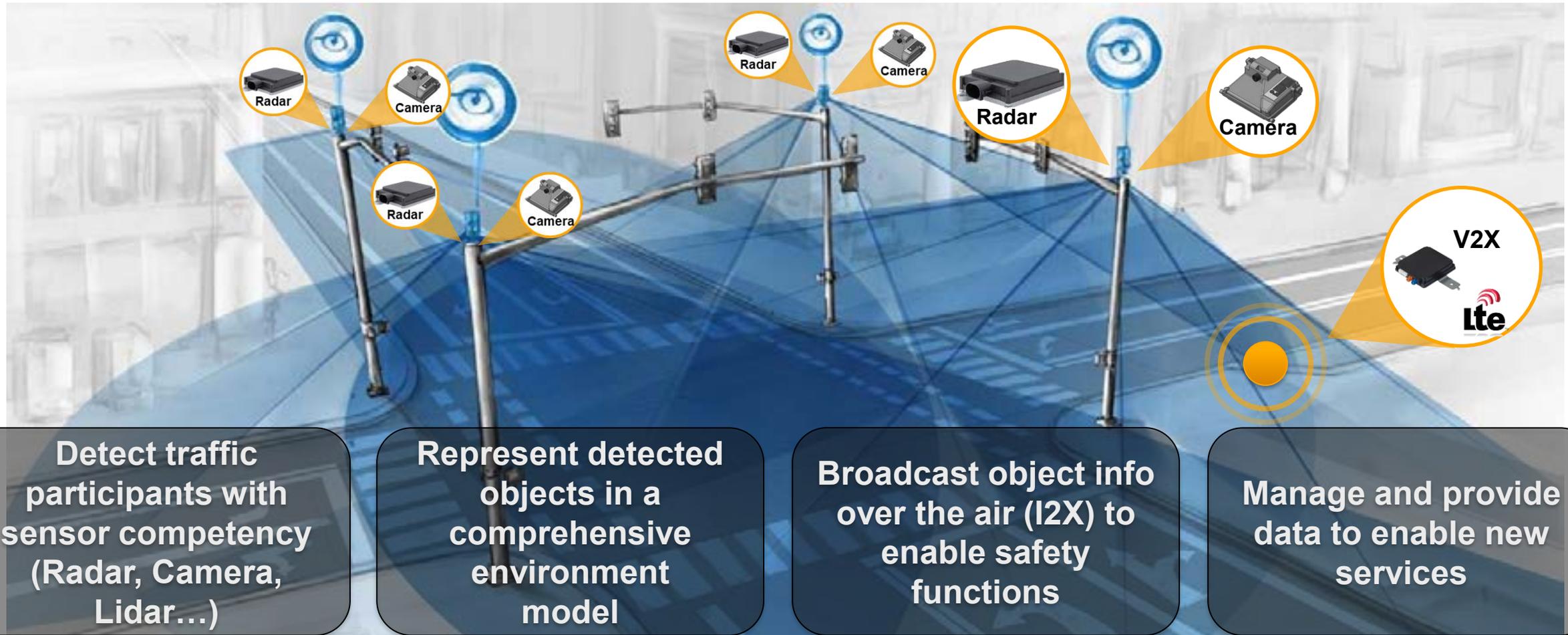
Efficiency

Increase traffic flow by providing more accurate & reliable data for drivers & traffic management

Manage complex intersections with automotive technology at the intersections

Safe Infrastructure Solutions

Intelligent Intersection, Implied Technologies



Smart Traffic Infrastructure System

Wrong Way Drivers Detection System: for Vision Zero



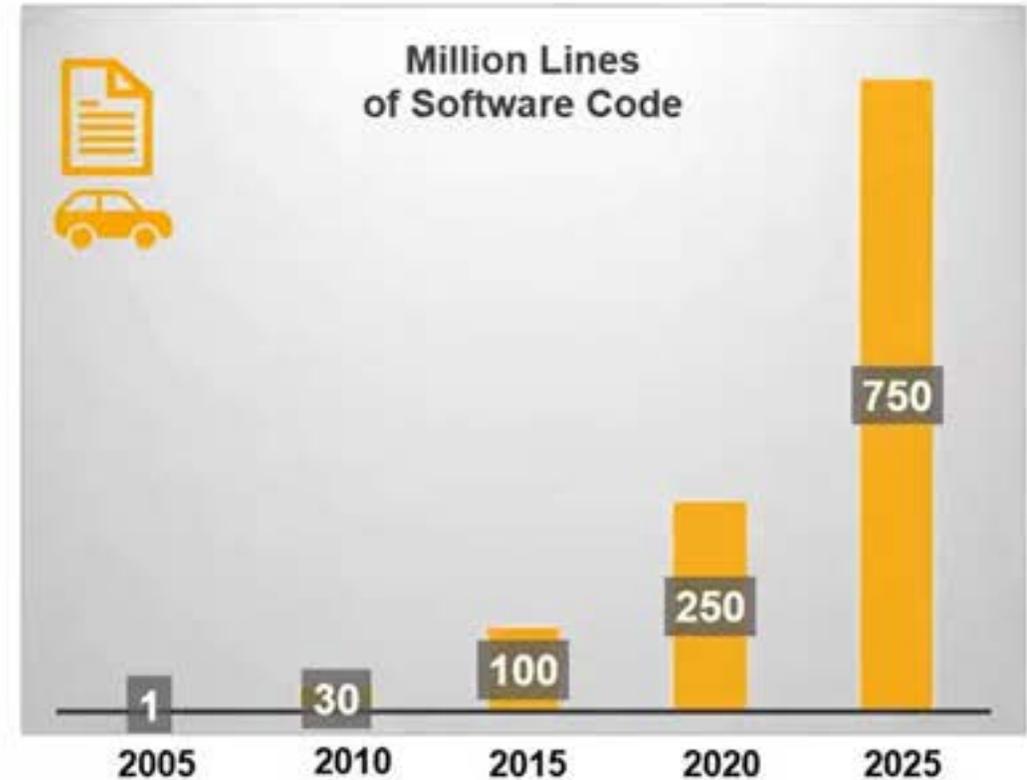
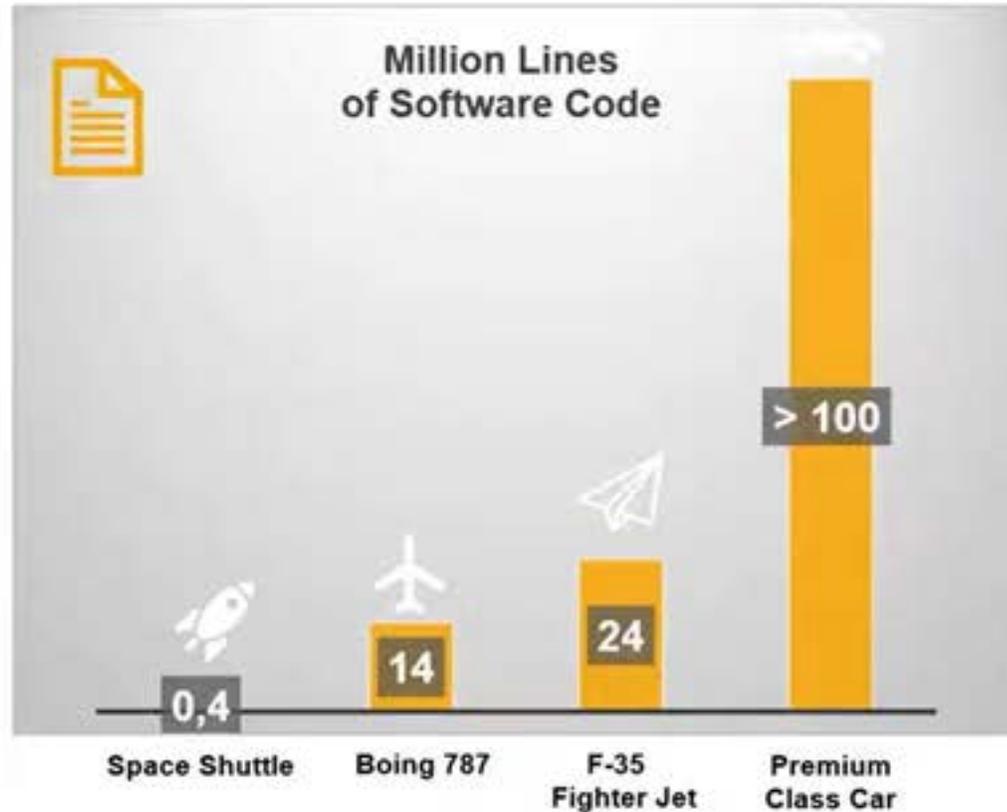
Safety

Warn at-risk drivers of a driver heading the wrong way



Increase safety by detecting Wrong Way Drivers on highways and notify at risk drivers

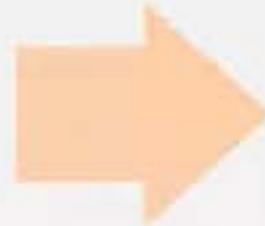
Increasing Importance of SoftWare Market Trend



Sources: Visualcapitalist, <https://www.visualcapitalist.com/millions-lines-of-code/>, NXP, <https://blog.nxp.com/automotive/cars-are-made-of-code>, both June 2020

Impact of Market Trends

Increasing SW Complexity overburdens today's EEA



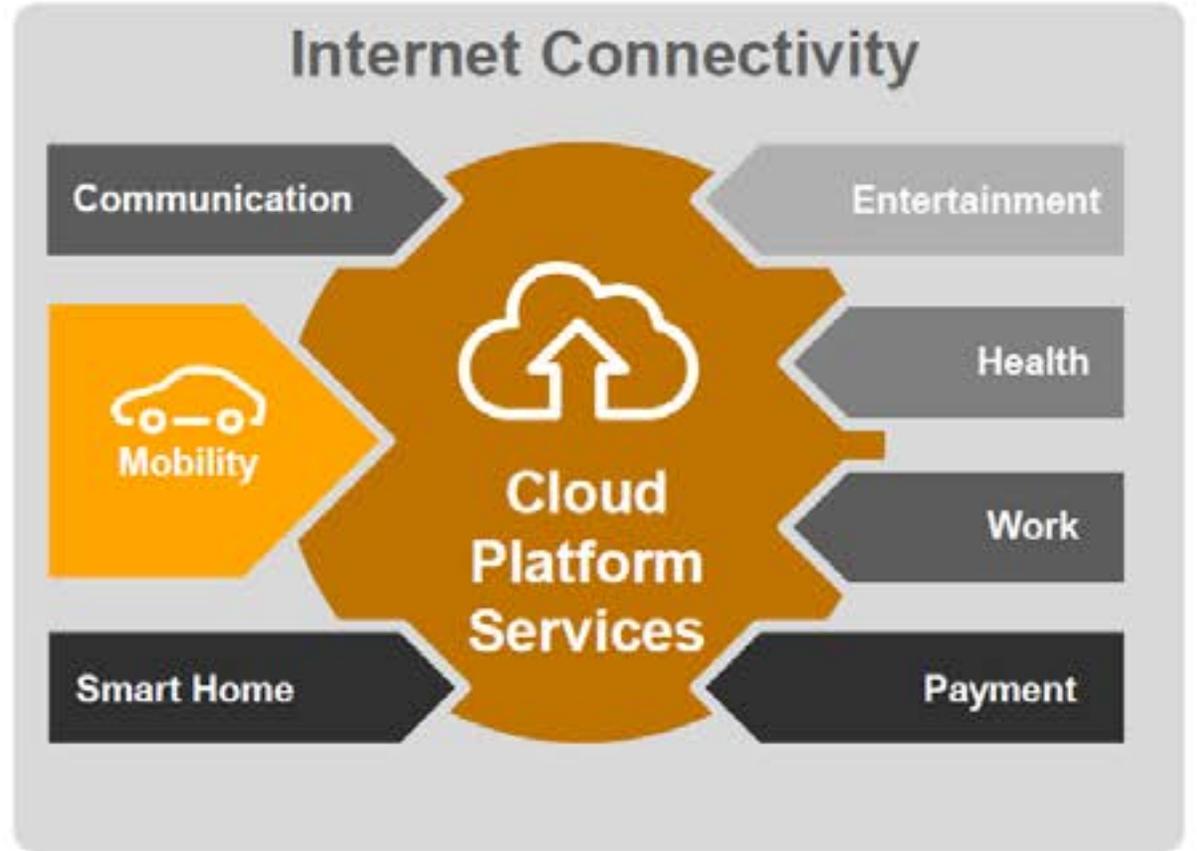
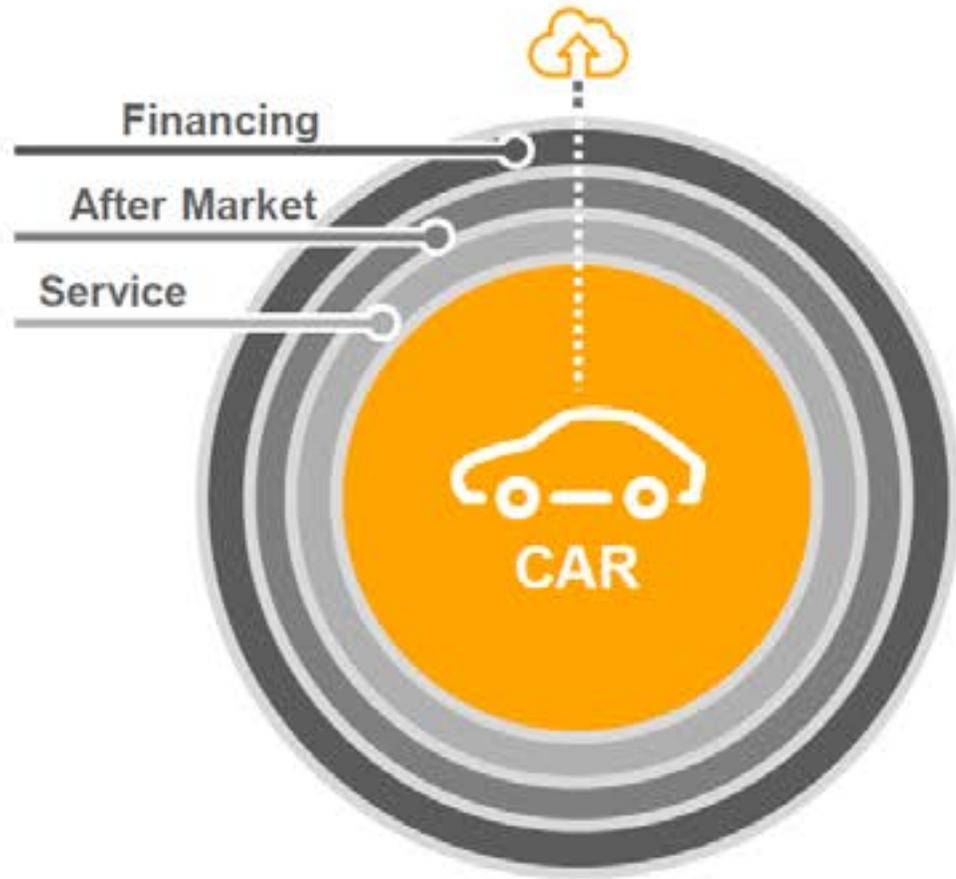
- › Complex amount of new software
- › Increasing demand for upgradeability & updateability
- › Cyber security requirements
- › Increasing number of involved project parties
- › New business models
- › ...

- › Current architectures are hardly capable to realize future mobility concepts
 - › High no. of ECUs with embedded software
 - › Complex wiring harness setup
 - › No scalability, no standardization
 - › ...

Upcoming market trends lead to increase of SW complexity and the need for new E/E architecture!

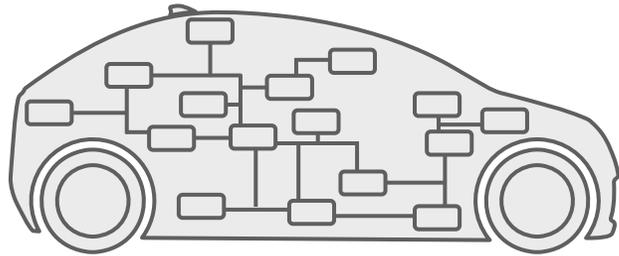
Vehicle Architecture Transformation

Change of Perspective



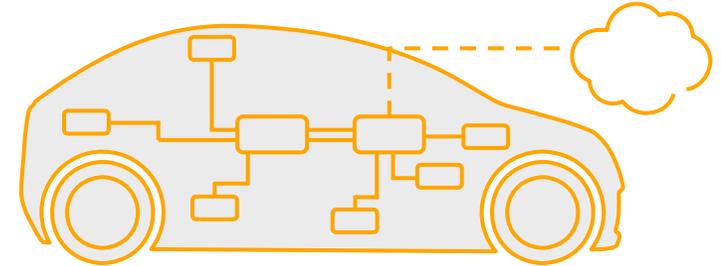
Leading the Way towards Software-defined Vehicles

Complexity & functional growth reaching its limits



Up2now

Going forward



Patchwork architecture

- › Up to ~100 ECUs, limited computing power
- › Functionality isolated in ECUs
- › Lots of wires
- › Limited cloud-based functionality

User expectation: pleasure, safety and convenience

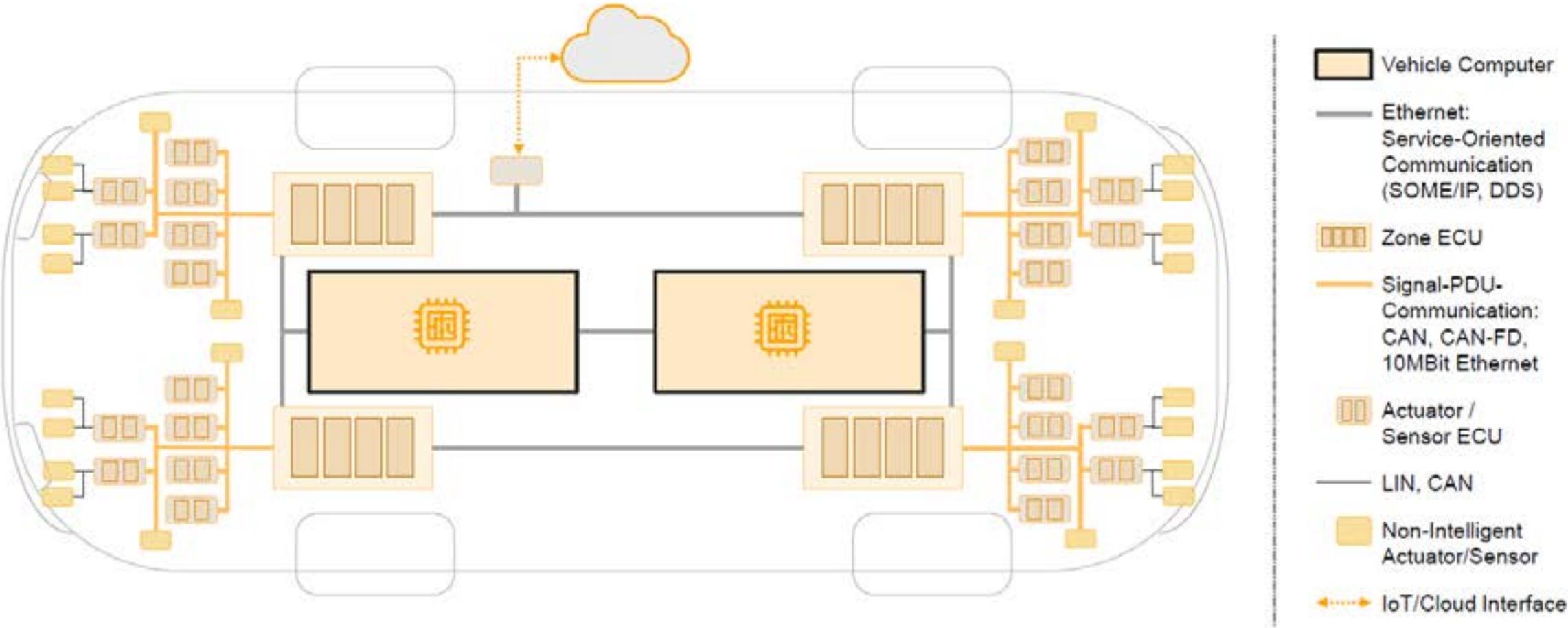
Function-defined architecture

- › Few High-Performance Computers and Zone Control, significant computing power
- › Functions defined by SW (HW abstraction)
- › ~50% reduction of wires
- › Always connected

User expectation: smart IoT device

New Vehicle Architecture

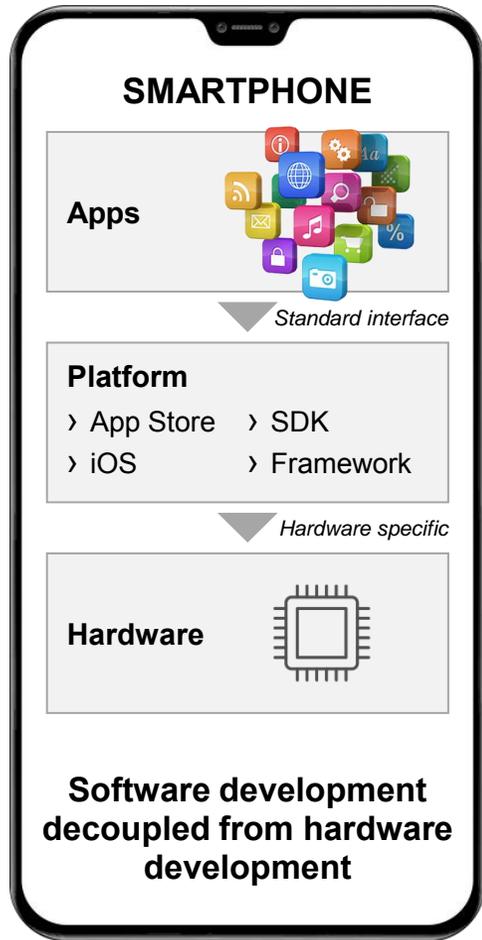
Server / Zone Architecture, Networking & Connectivity



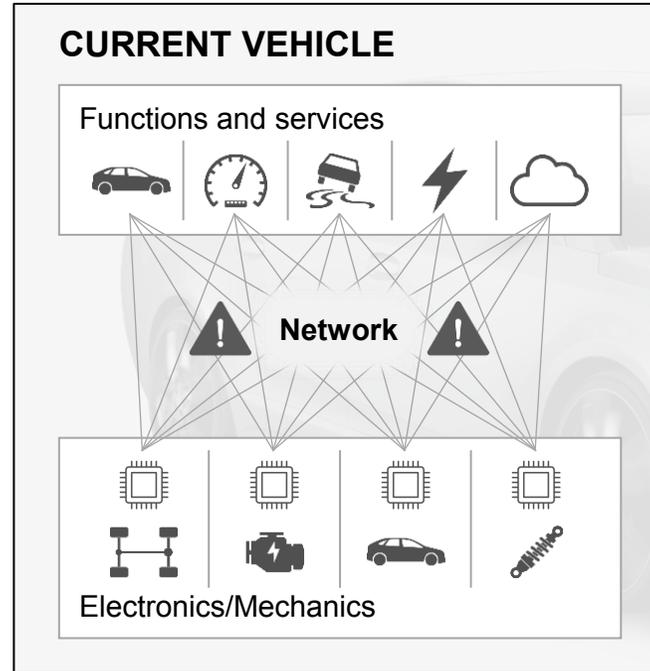
Example: C/D Segment Vehicle w L3 ADAS: 2 Vehicle Computers / 4 Zones

The Software Defined Vehicle

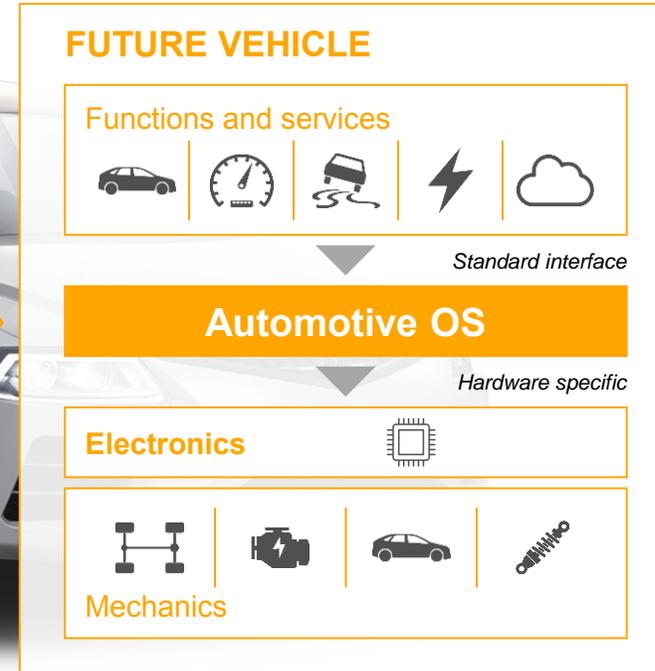
Automotive OS and Software Platform Benefits



VS.



Lack of "one language" for communication between functions and hardware

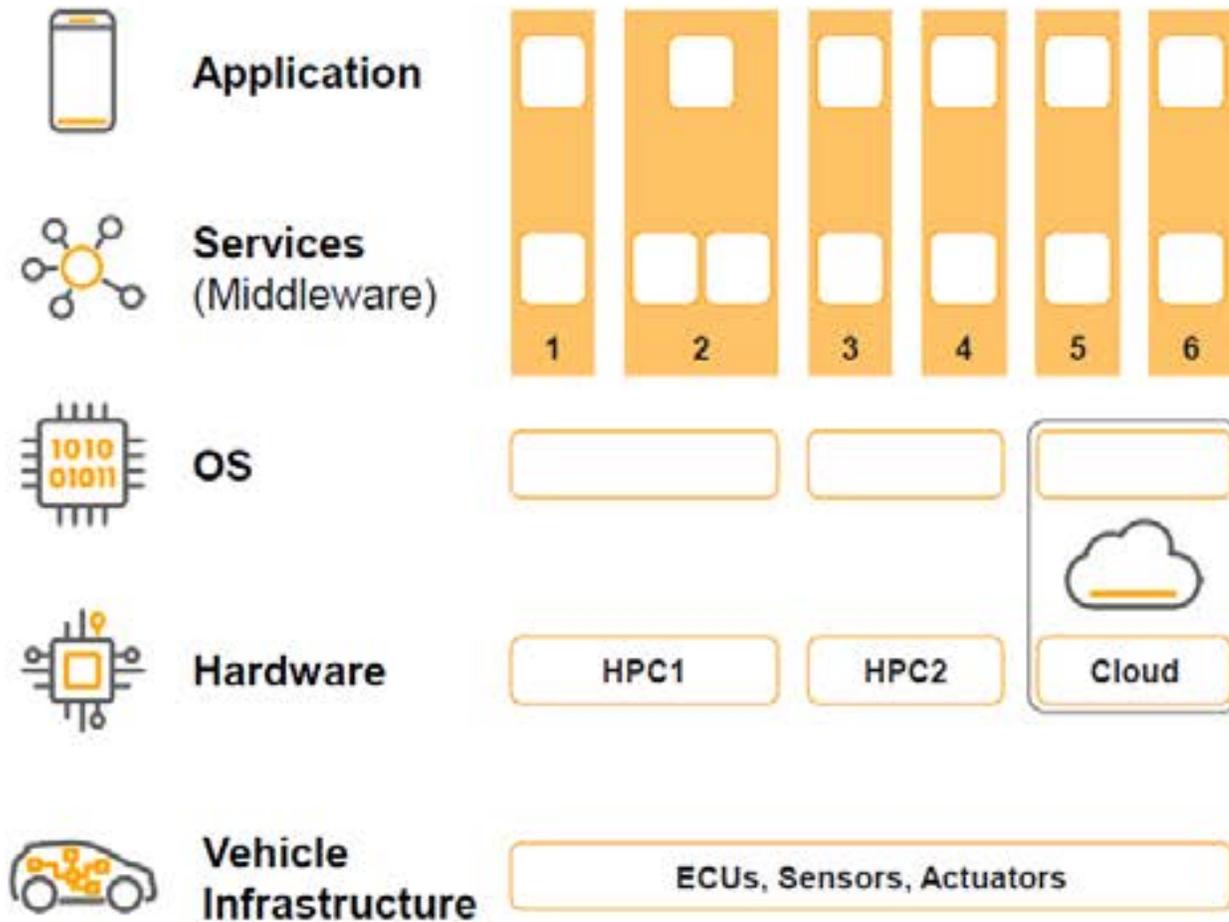


Development of functions decoupled from cycle of hardware development

Integrated HW/OS/DevOps environment enables flawless application

The Software Defined Vehicle

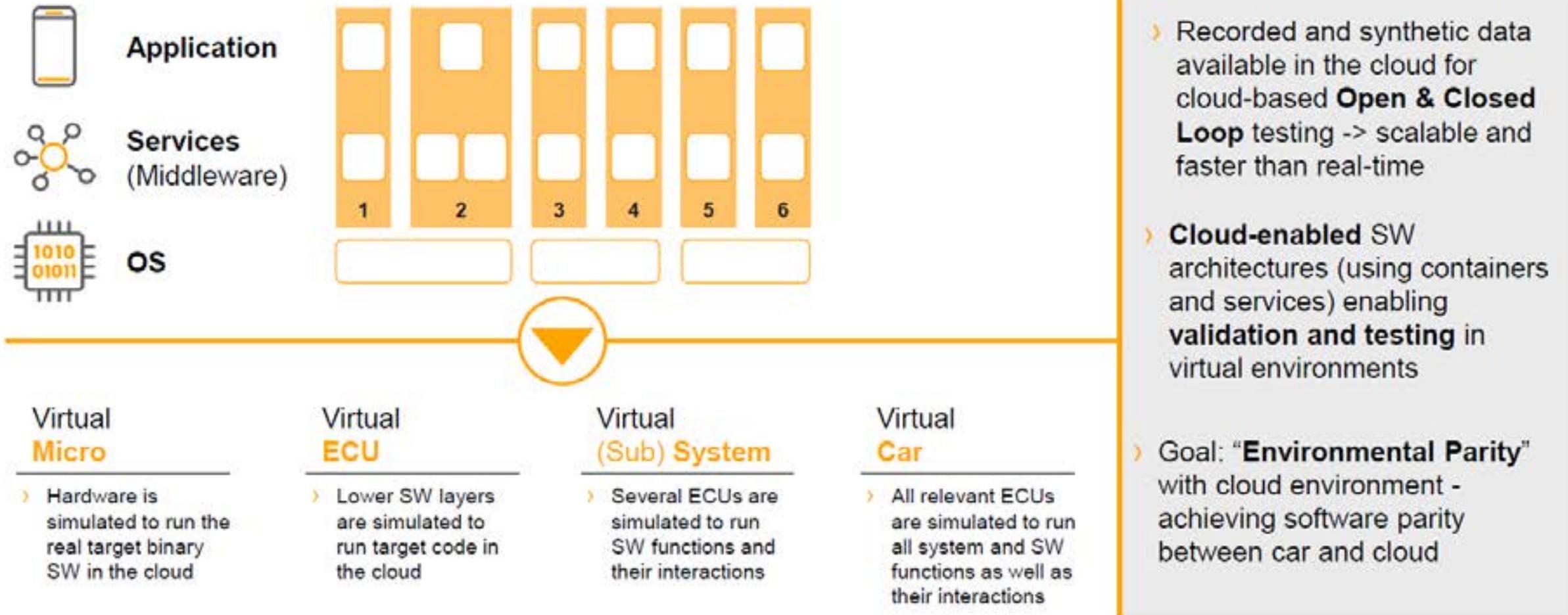
HW / SW Separation, Service Orientation & Cloud enablement



- › **Services:** Self-contained, black box for its consumers
- › **Containers** enabling decoupling of SW functions from hardware
- › Enabler for **mixed-critical** security and safety concepts
- › **Flexible** deployment & **distribution** of applications and services between **vehicle and cloud**

The Software Defined Vehicle

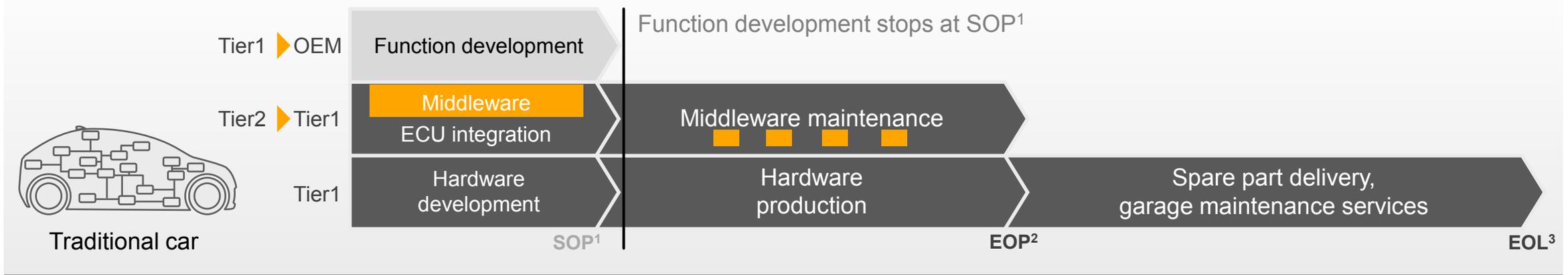
Virtual Development: Simplify & Accelerate System Development



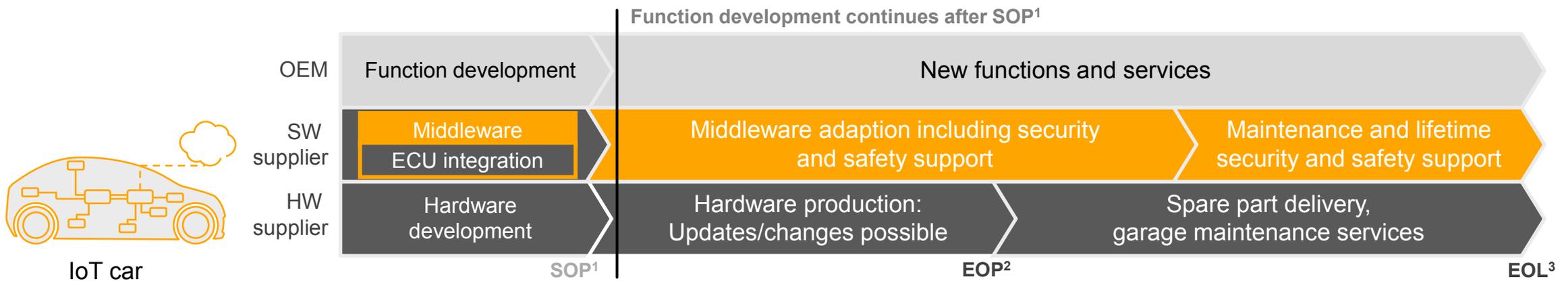
IoT Ecosystem Architecture Transformation

Trust-based Collaboration & Partnership Models

Hardware and function coupling – Software treated like hardware



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



SW Defined Vehicles & Smart Mobility: Sustainable, Safe, Efficient, Affordable and Seamless

- › **Smart and Sustainable Mobility will be an integral part of our future Smart Cities**
e.g. **Automated Driving, Connected Vehicles, Fleet Management, Public Transportation, Mobility as a Service**
will enable:
 - ✓ - **More efficient and cheaper Development and Production Processes**
 - ➔ Customer Driven Evolution
 - ✓ - **Mobility for all, Higher Safety, Lower Emissions, Higher Comfort, More Affordable**
- › **Complexity requires new Vehicle Architecture & Mode of Development:**
Decoupling HW/SW, Function- & SW-defined Vehicle, Virtual Dev., Reuse, Agile, Collaboration
- › **New Competences needed:** System Thinking, AI, Big Data, Cloud, Cyber Sec., **Microelectronics ...**
- › **Data Access, Standardization** is a precondition
- › **Participation of City Infrastructures**, e.g. V2X, Living Labs & **European legislation** needed
- › **Offers great R&D opportunities for engineers** at the interface of car, IT and computer technology

EMERGENCY EXIT / ISSUE DE SECOURS

**WE MAKE
AUTONOMOUS MOBILITY
HAPPEN**



Continental Corporation in Romania Showcase. Our Technology in the Community

CUbE Demo Downtown & Smart and Sustainable Urban Mobility Roundtable

- › 23.06.2022: Local authorities, business partners, citizens experienced and discussed about the integration of smart urban mobility features supported by Continental



Key Messages / Prerequisites 1

- › **Smart and Sustainable Urban Mobility will be an integral part of our future Cities**
e.g. **Automated Driving, Connected Vehicles, Fleet Management, Public Transportation**
to enable:
 - **Mobility** for all, Higher **Safety**, Lower **Emissions**, Higher **Comfort**
 - **More efficient and cheaper Development and Production Processes**→ Customer Driven Evolution
- › **High International Competition** requires **European Way**
 - European **Industry Politics** (Consistency and Sustainability needed!)
 - European **Funding**
 - European **Legislation / Homologation** / Enabling also **Testing on Public Roads!**
- › **Data Access, Standardization** is a precondition
- › **Participation of City** Infrastructures, e.g. V2X needed

Key Messages / Prerequisites 2

- › **Work Force and Education:**
 - **More Students in IT and SW-engineering** necessary
 - Structured Development and Implementation of new **Technology Field** like **SW-Structures, Cyber Security, Big-Data** Management, **Artificial Intelligence Cloud** Technology, **Battery** Technology, **5G** Technology, **Connectivity, Robotics, Computer Vision, Speach** Recognition, ...
- › **Start-Up / Hackathon culture** needed (focus on maturity)
- › Initiative (Local + Regional + National) „Smart“, IoT, „xxx 4.0“ → „xxx 5.0“ needed
- › **European Area-Wide/borderless 5-G network infrastructure** needed

Public Private Partnership

Key Messages

- **Transparent Public Private framework** needed
 - industry to support **innovation in public sector** (non-commercial collaboration)
- **Autonomous Driving legislation** needed
 - considering: 5G, AI, Edge Computing, electrification, “green” infrastructure
- **Public Private joint strategy**
 - increase attractiveness of Romania for new business in innovation
- **Infrastructural R&I resources**
 - to be developed by authorities (Living Lab, Test Track etc.)
- **Collaborative European public funding including “big industry”**
 - allow big industry to support academia and SME’s (faster time to market)

Next Steps

Creating local living Labs

- › Collaboration of City, University, local Tech Companies and Start-Ups on specific Use Cases
- › Funding possibilities

Possible Projects

- › Digital Service Platform for City
- › Safety for Public Transport Systems
- › Intelligent Intersections with digital Guardian Angel
- › Smart Parking
- › Integrating different renting platforms (bike, scooter, ...)



Software Defined Vehicles – Enabling The IoT Mobility Ecosystem

Automotive Software Strategies Conference – April 27th, 2022

Michael Huelsewies | Head of Architecture & Software @ Continental

Software Defined Vehicles – Enabling The IoT Mobility Ecosystem

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Vehicle Architecture Transformation

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The Software Defined Vehicle

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Our Approach

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Collaboration, Partnerships & Summary

Software Defined Vehicles – Enabling The IoT Mobility Ecosystem

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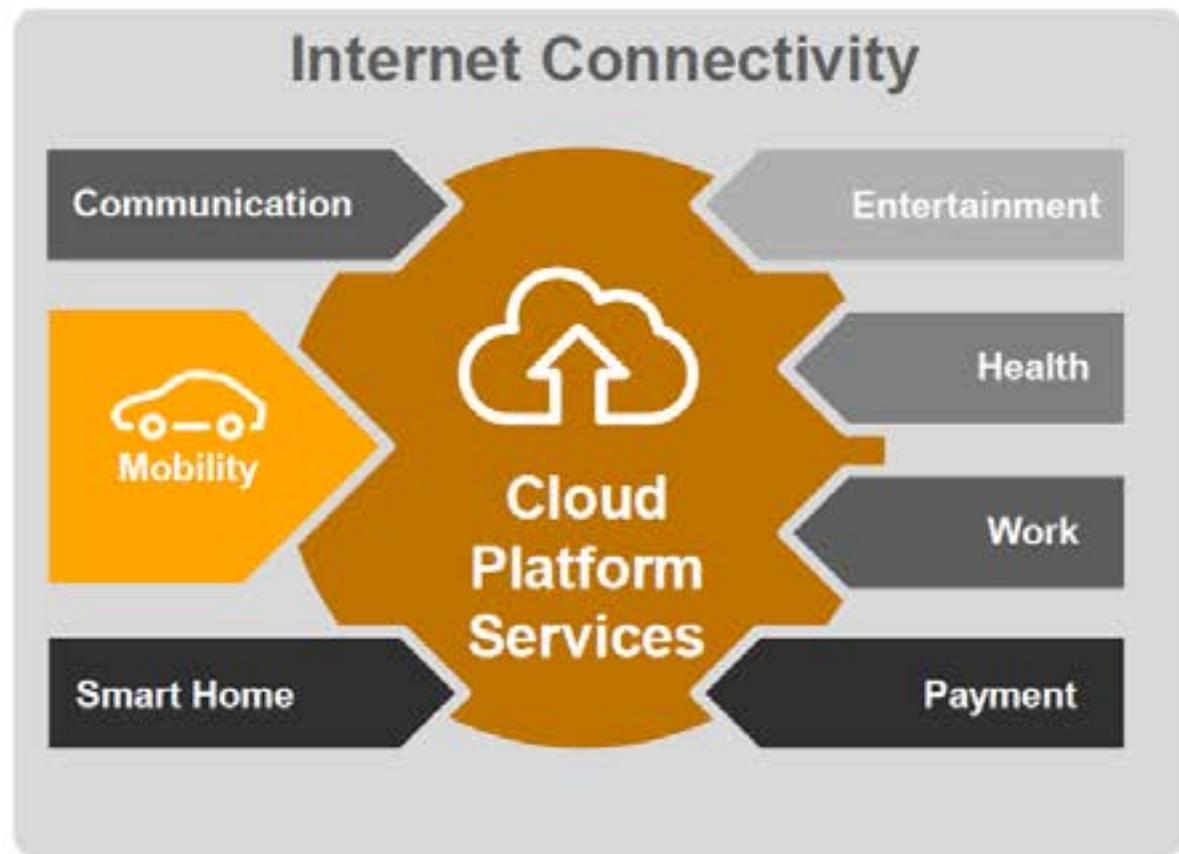
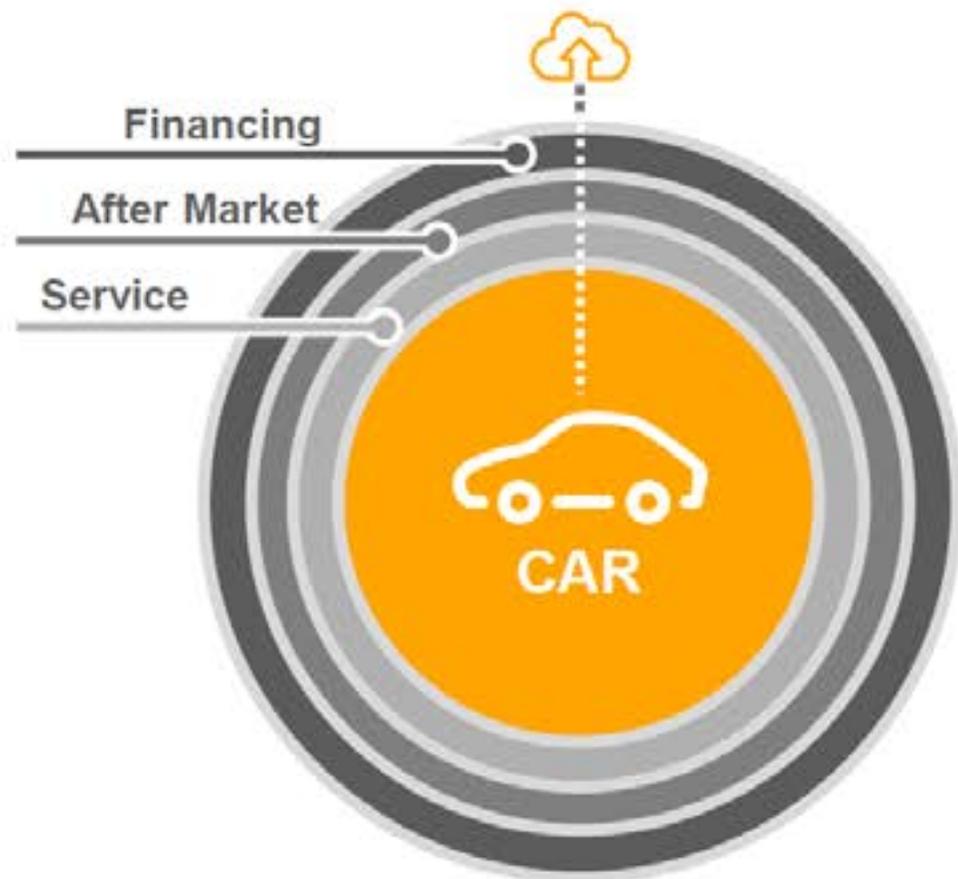
Our Approach

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Collaboration, Partnerships & Summary

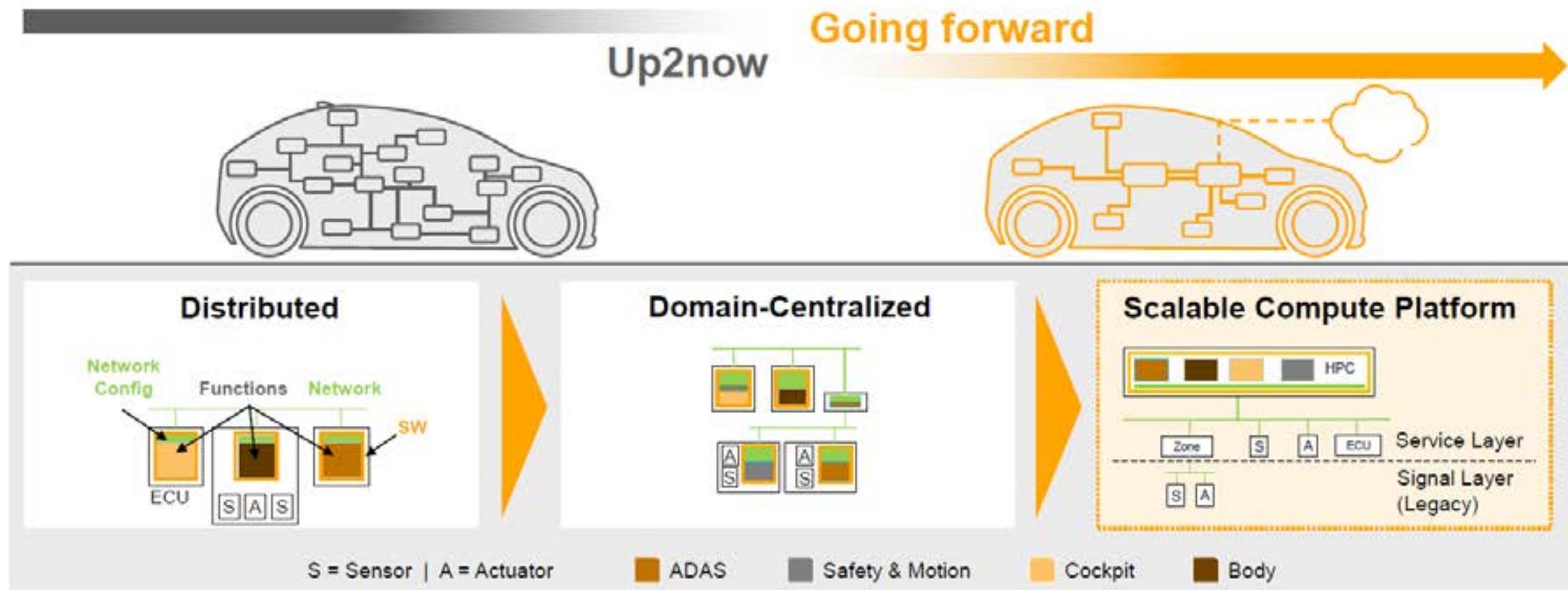
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Change of Perspective



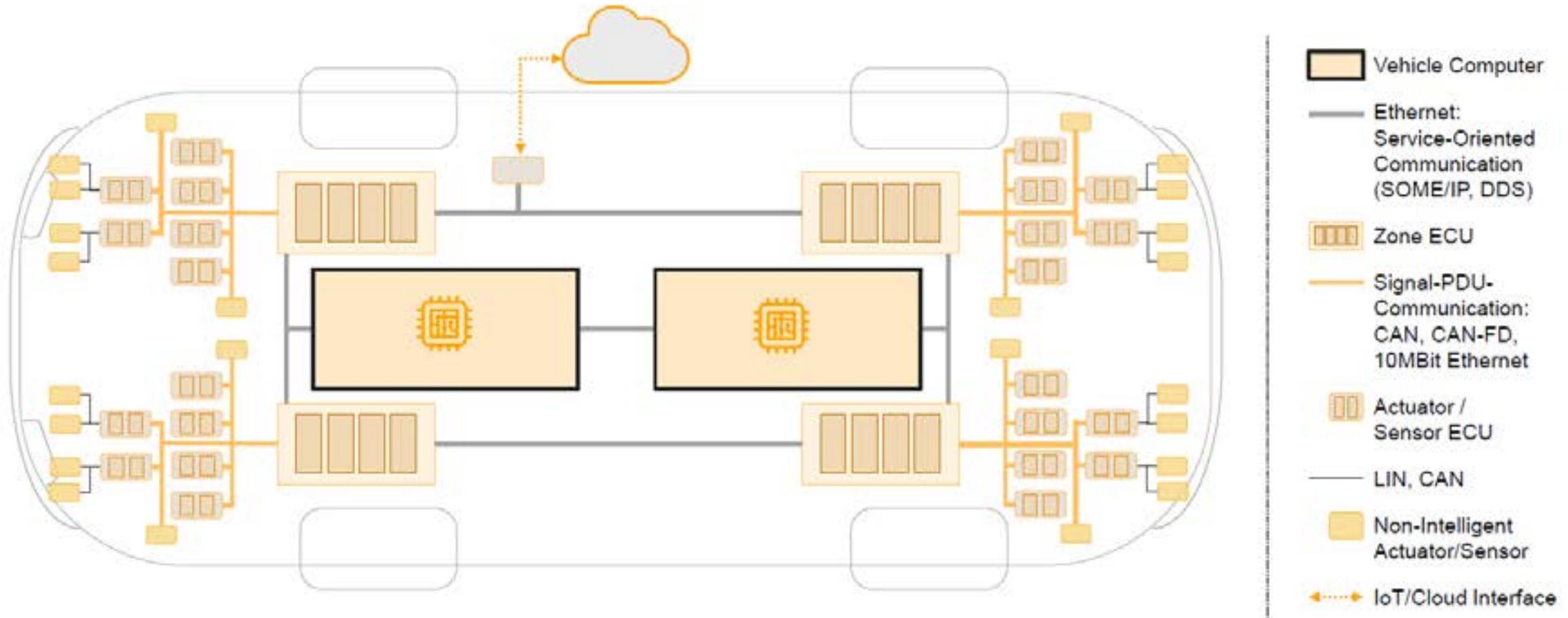
Vehicle Architecture Transformation

Scalable Compute Platforms – Enabler for Smart IoT Mobility



Vehicle Architecture Transformation

Server / Zone Architecture, Networking & Connectivity



Example: C/D Segment Vehicle w L3 ADAS: 2 Vehicle Computers / 4 Zones

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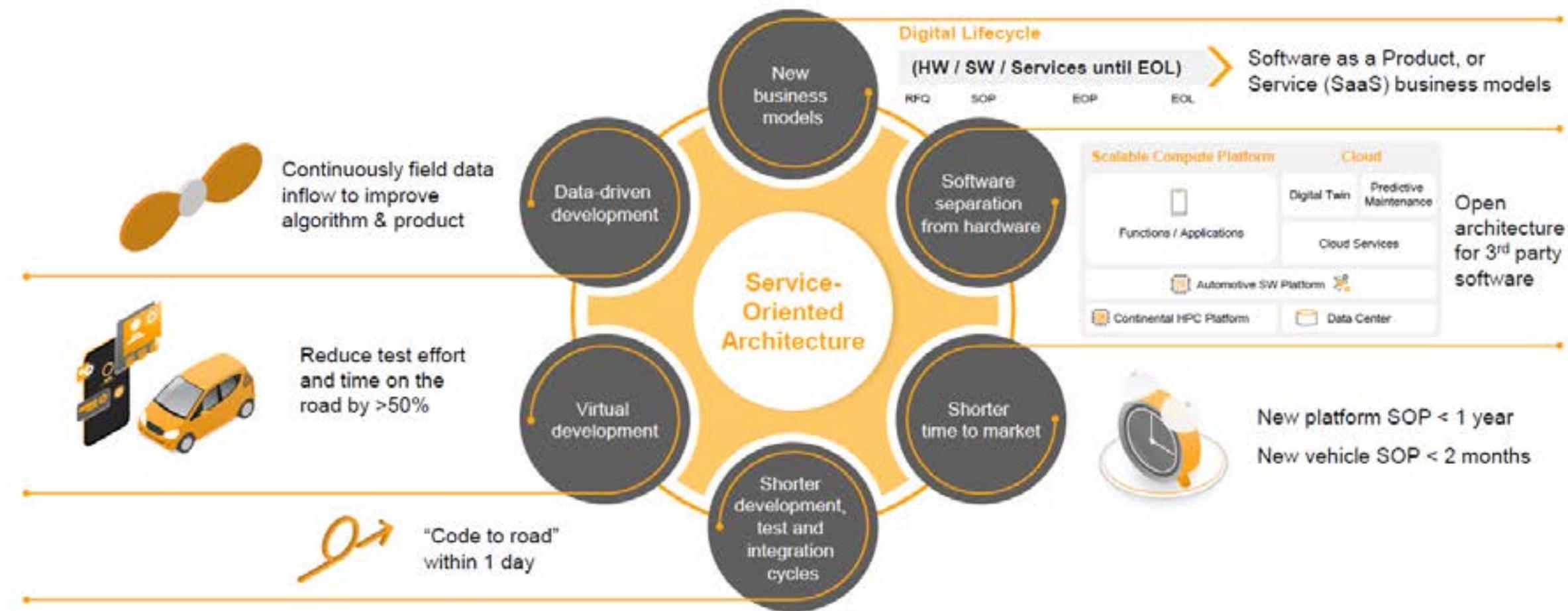
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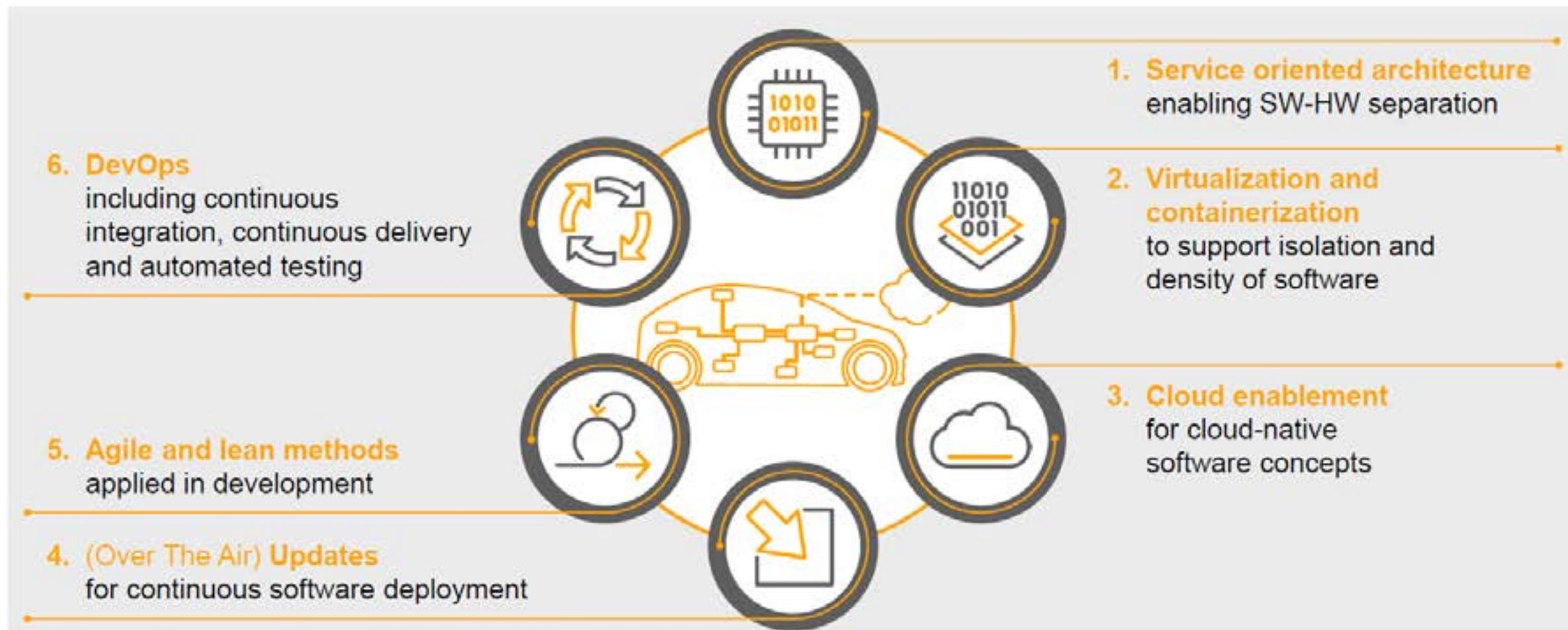
The Software Defined Vehicle

What to accomplish with the Software Defined Vehicle?



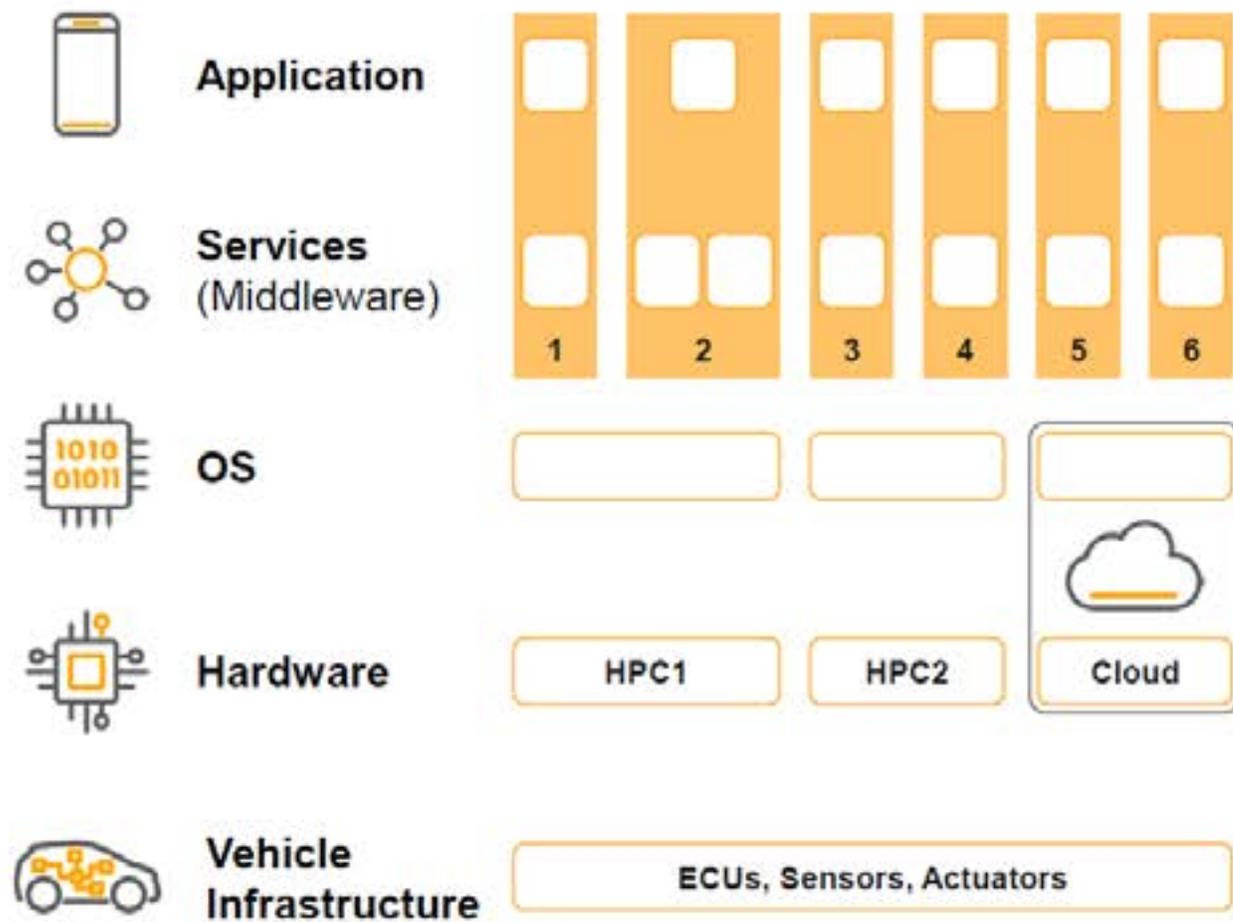
The Software Defined Vehicle

Key Elements And Attributes



The Software Defined Vehicle

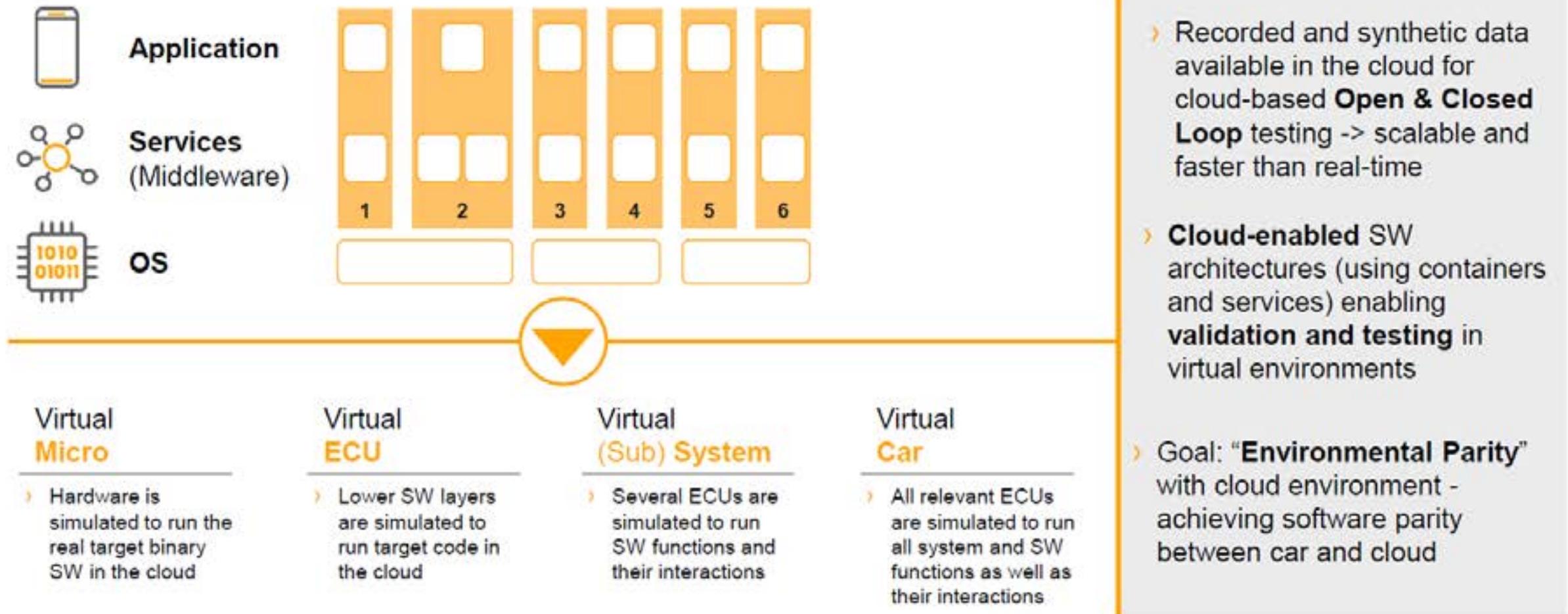
HW / SW Separation, Service-Orientation & Cloud enablement



- › **Services:** Self-contained, black box for its consumers
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The Software Defined Vehicle

Virtual Development: Simplify And Accelerate System Development



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Our Approach: Continental Automotive Edge Framework

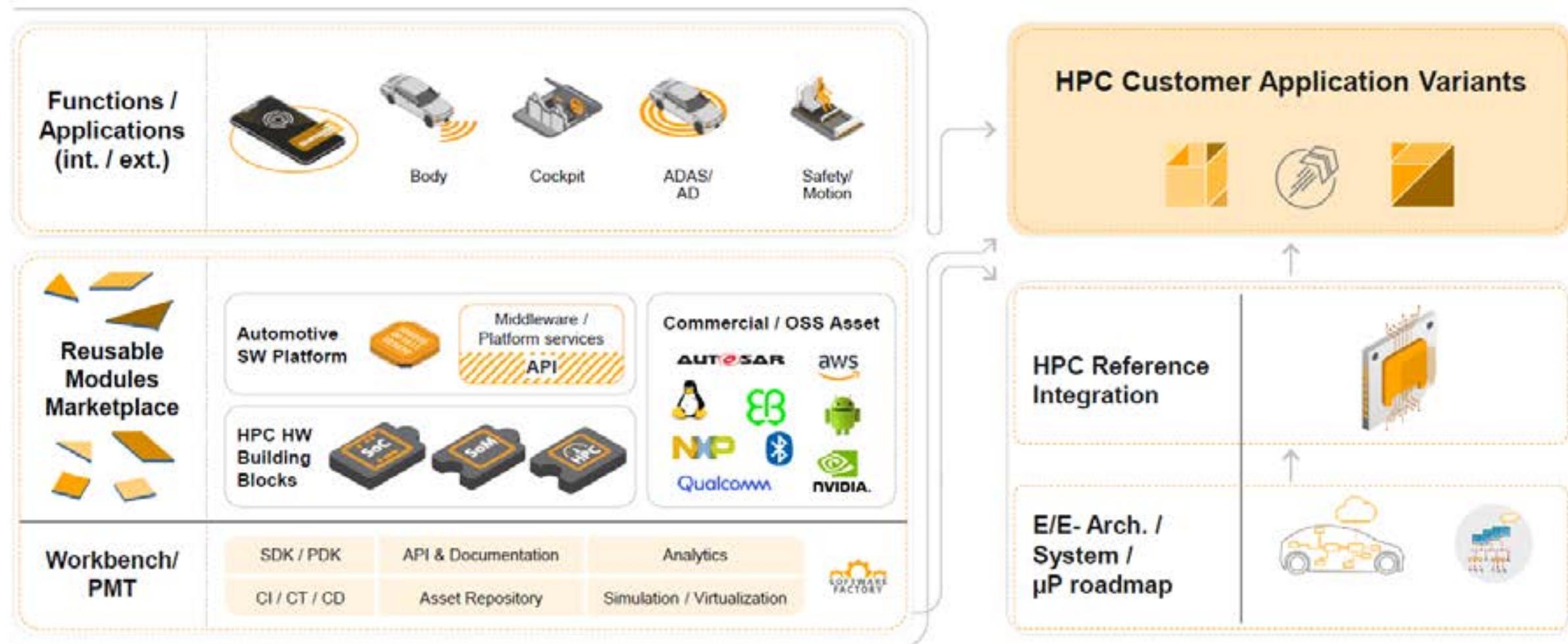
Our full-stack IoT architecture solution



* μ P = Micro-Processor, SoC = System on Chip, SoM = System on Module; CI/CD: Continuous Integration / Continuous Deployment

Our Approach: Continental Automotive Edge Framework

Value Generation: From Reusable Modules to Integrated Solutions



Our Approach: Continental Automotive Edge Framework

Development Kits – Enabling Efficient Product Development



HPC Reference Integration



Automotive SW



Workbench



Cloud



Accelerate
development and
integration of HPC solutions
& distributed applications



Provide
a platform solution, clear
interfaces & development
environment



Enable
seamless development
of service-oriented IoT
ecosystem architectures

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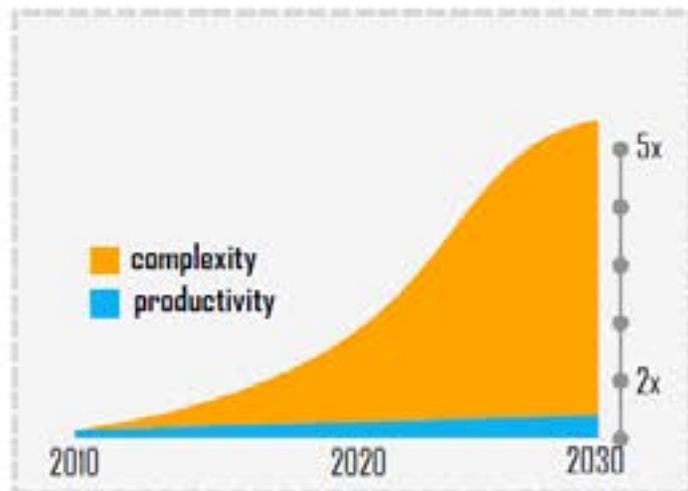
Collaboration, Partnerships & Summary

Collaboration, Partnerships & Summary

Open Source Software in Automotive



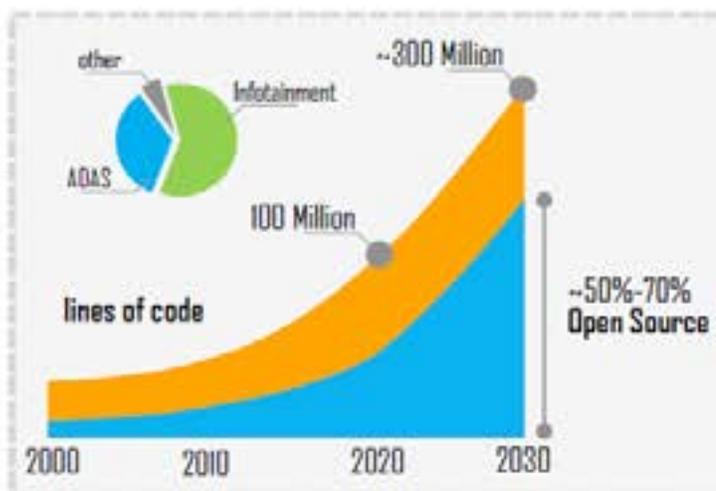
Complexity vs. Productivity
in automotive software development



<https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/the-case-for-an-end-to-end-automotive-software-platform>



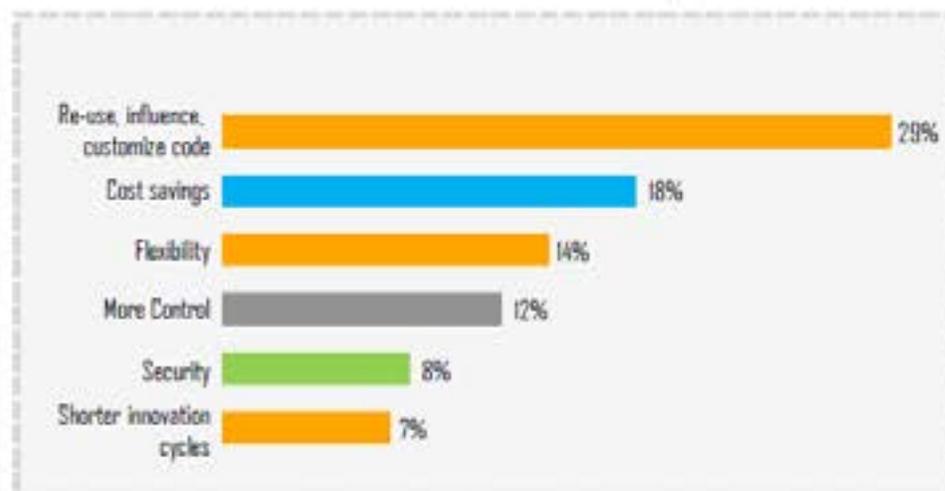
Software in Vehicles
in lines of code



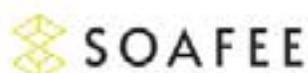
<https://www.automotiveworld.com/articles/auto-industry-first-for-software-is-quenched-by-open-source/>



Reasons for Usage of OSS
in the automotive industry

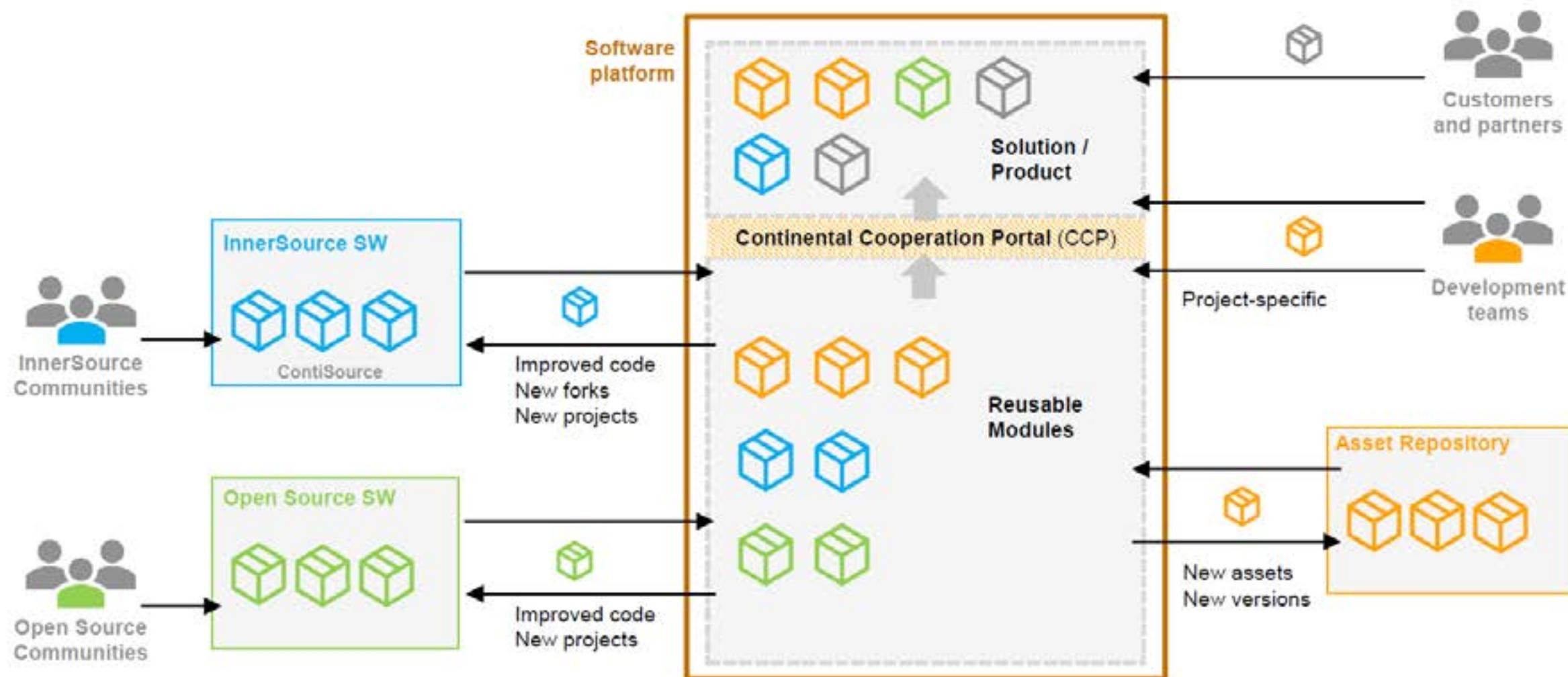


<https://newsroom.eclipse.org/eclipse-newsletter/2021/july/driving-digital-transformation-open-source-software>



Collaboration, Partnerships & Summary

Collaboration-based development practices



Collaboration, Partnerships & Summary

Key success factors / Conclusions



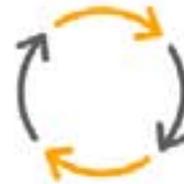
Ecosystem /
Value Chain



Open
APIs & SDKs



Collaboration
Models



Fast Cycles



DevOps
Culture



Toolchain /
PMT



› **Modular framework architectures** to optimize re-use, time-2-market and cost



› **Definition and management of interfaces** is key for speed and maturity of SW development



› **Cloud-native** concepts (technology, processes) will become standard



› **Cross industry collaboration in ecosystems** will bring the SDV successfully to the road

Continental 
The Future in Motion

Agenda – Day 1

Mo April 4th (2-4pm CET)

Topic	Details	Duration	Responsible
Welcome and Agenda	Welcome, Agenda	5 min	Christian von Albrichsfeld + team
Location presentation	Presentation of location, organization, strategy, strategic focus and people topics, ...	20 min	Christian von Albrichsfeld + team
Virtual location tour / marketplace BAs + QL lab	BA Presentation SAM PSS	1h 25 min + 5 min break	Cristian Enculescu + team
	BA Presentation UX		Peter Kovacs + team
	BA Presentation CE/AN		Ciprian Samfescu + team
	BA Presentation SMY		Bogdan Troie + team
	QL Tour		Ciprian Bleoju + team
	BA Presentation ADAS		Simona Belea + team
Closing 1st day		5 min	Christian

Agenda – Day 2

Tue April 5th (2-4pm CET)

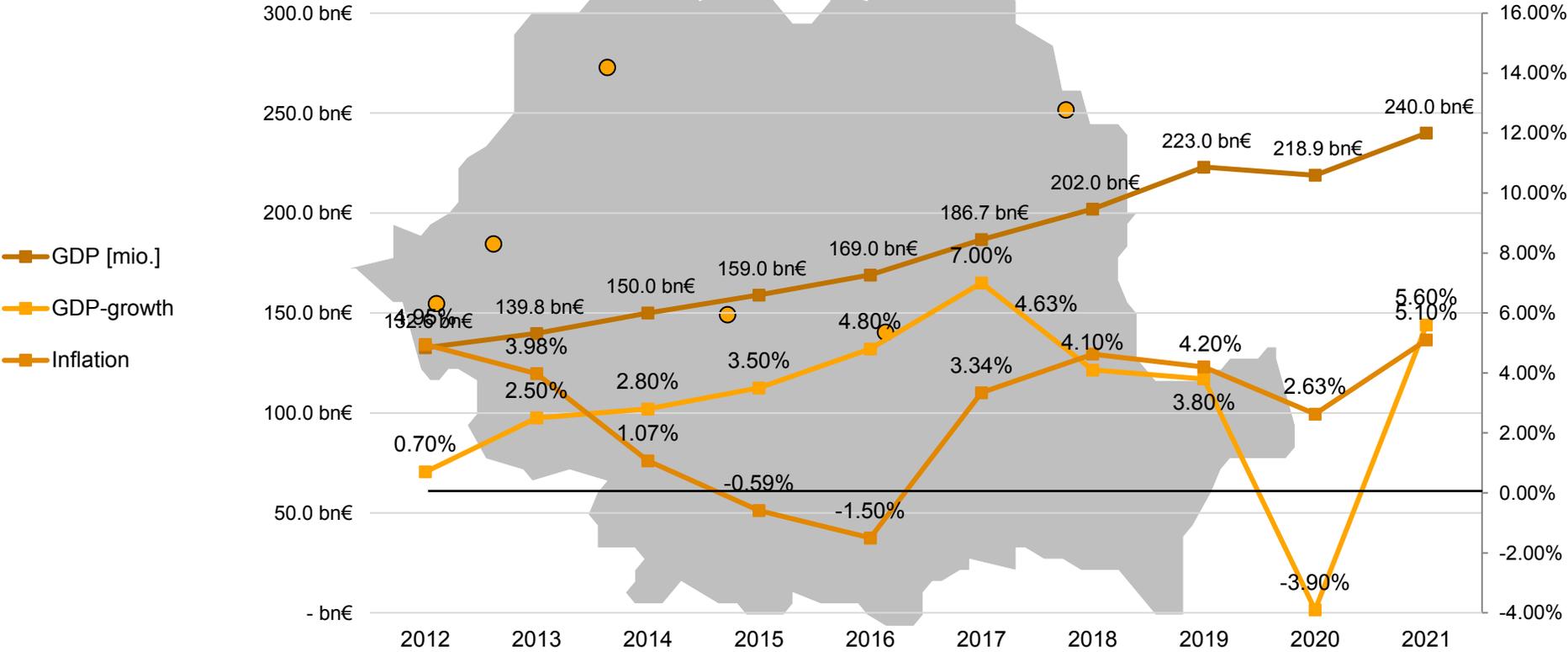
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Discussion and Wrap-up	Open discussions he[a]t leaders with location leaders	25	All

Romania Macroeconomics: growing in stable conditions

GDP growing, inflation increasing, infrastructure improving

Ukraine effects not considered yet

Economic Key Facts Romania



6,72%
Budg.deficit vs GDP* 2021

~48,5% Public dept vs GDP 2021

2.72% Unemployment rate 2021

4,5% Growth FC in 2022

Continental Corporation in Romania

Top Employer → Most Desired Employer Survey

Internal Activities

- **30+** Internal Events & Campaigns: 150 years anniversary, Automotive Award, Town Hall Meetings, Webcasts, Management Meetings, Leadership & TechTalks, Corona, Health/ Women/ Children Day, ...)
- **15+** CSR Activities with Employees (Marathons, Blood/ Food/ Clothes/ Toys/ Backpacks/ Gifts donations, March/ Christmas fairs, fundraisings, volunteering activities, events ...)
- **280+** Internal communication through all channels

External Activities

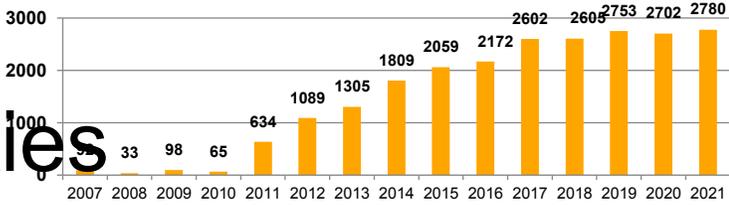
- **2780** Media Mentioning: Press Releases (29), Media Trip (8 days); Articles (684), Events & Conferences (25+), Company Awards (7)
- **526** Social Media Activities: TechTalks (10), Facebook (262 posts, 54 campaigns), LinkedIn (185 posts, 15 campaigns)
- **10** Recruiting events & **28** Technical & Project Competitions
- **23** Strategic Educational Partnerships: Dual Vocational Schools (5) & Universities (18)
- **20+** Corporate Social Responsibility activities



Rank	Most desired employers 2016	Rank	Most desired employers 2017	Rank	Most desired employers 2018	Rank	Most desired employers 2019	Rank	Most desired employers 2020	Rank	Most desired employers 2021
1	Oracle	1	Oracle	1	Oracle	1	Continental	1	Continental	1	Microsoft
2	Google	2	Microsoft	2	Continental	2	Oracle	2	Oracle	2	Continental
3	Microsoft	3	IBM	3	Microsoft	3	Microsoft	3	Microsoft	3	Oracle
4	IBM	4	Continental	4	IBM	4	IBM	4	Amazon	4	Amazon
5	Continental	5	Google	5	Amazon	5	OMV Petrom	5	IBM	5	IBM
6	OMV Petrom	6	OMV Petrom	6	OMV Petrom	6	Bosch Romania	6	OMV Petrom	6	Endava
7	KPMG	7	Vodafone	7	Grup Renault Romania	7	Vodafone	7	Bosch Romania	7	Bosch Romania
8	Vodafone	8	Amazon	8	Vodafone	8	Amazon	8	ING Romania	8	Ing Romania
9	HP (Hewlett-Packard)	9	Grup Renault Romania	9	Google	9	Grup Renault Romania	9	Vodafone Romania	9	Omv Petrom
10	Coca-Cola HBC	10	Coca-Cola HBC	10	Bosch Romania	10	Orange	10	Grup Renault Romania	10	Vodafone Romania

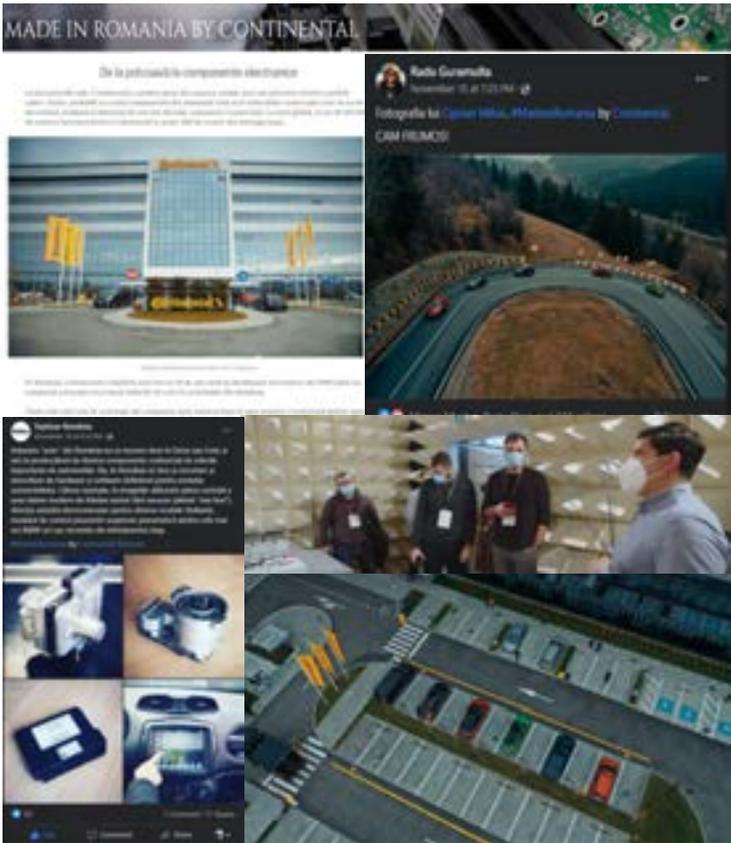
Engineering, Romania			
1	CONTINENTAL	21	ENGE
2	BOSCH ROMANIA	22	ENDAVA
3	OMV PETROM	23	FORD
4	GRUPUL RENULT ROMANIA	24	COCA-COLA HBC ROMANIA
5	MICROSOFT	25	AUTOLIV
6	AMAZON	26	HONEYWELL
7	ORACLE	27	SCHAEFFLER ROMANIA
8	HELLA ROMANIA	27	STRABAG
9	IBM	29	NTT DATA ROMANIA
10	LIDL ROMANIA	30	ING
11	E.ON ROMANIA	31	KALIFLAND ROMANIA
12	SIEMENS SRL	32	VITESCO TECHNOLOGIES
13	VODAFONE ROMANIA	33	BITDEFENDER
14	ENEL	34	MICHELIN ROMANIA
15	EMERSON	35	NOKIA ROMANIA
16	BOMPETROL - IOMG INTERNATIONAL	36	DRAXLMAIER
17	ING ROMANIA	37	LUXOFT ROMANIA
18	GOOGLE	37	HUAWEI
19	ORANGE	37	ELECTRICA
20	EMAG	40	PREH ROMANIA

Continental Corporation in Romania Orchestrated Country Communications Activities



~7,6 mentionings every day

#Made in Romania 8 Days Media Trip



Coronavirus vaccination centers & actions



Internal & External Events



Continental Corporation in Romania

External Communications 2021 in a Nutshell



2,780
Press Monitoring



684
Press Articles



3K people
Reach Media Trip
& Tech Talks



7
Company Awards



CSR
Activities &
Sponsorships

Order of Industrial & Commercial Merit in rank of Officer – President of Romania



Business Gala



City Hall

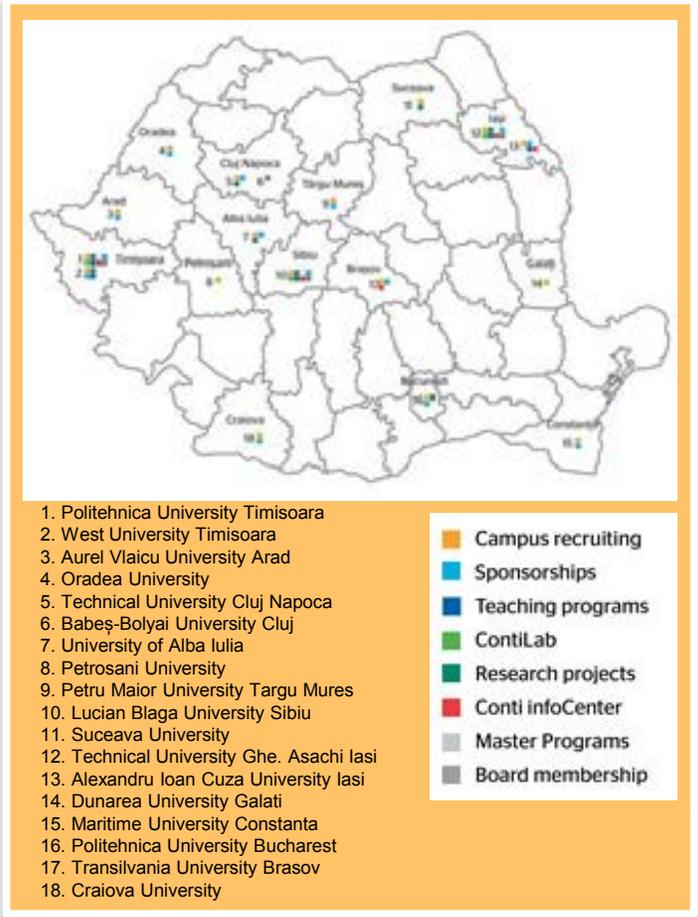


University



Continental Corporation in Romania

Educational Partnership: Vocational School & University



Educational Partnership for Growing Talents

Timisoara Example: Vocational School & University

Vocational School Timisoara (German dual model)

- › Continental: Initiator and Founding Partner
- › Law initiated in 2011; First Class started 2012

-  231 graduates
-  + current pupils
-  All 3 Timisoara locations involved
-  5 Target Functions
-  Continental has impact on the learning content
-  School Board Member



Working meeting with Education Minister



1st Graduation Ceremony at Continental with national and local politicians

University Board: UPT

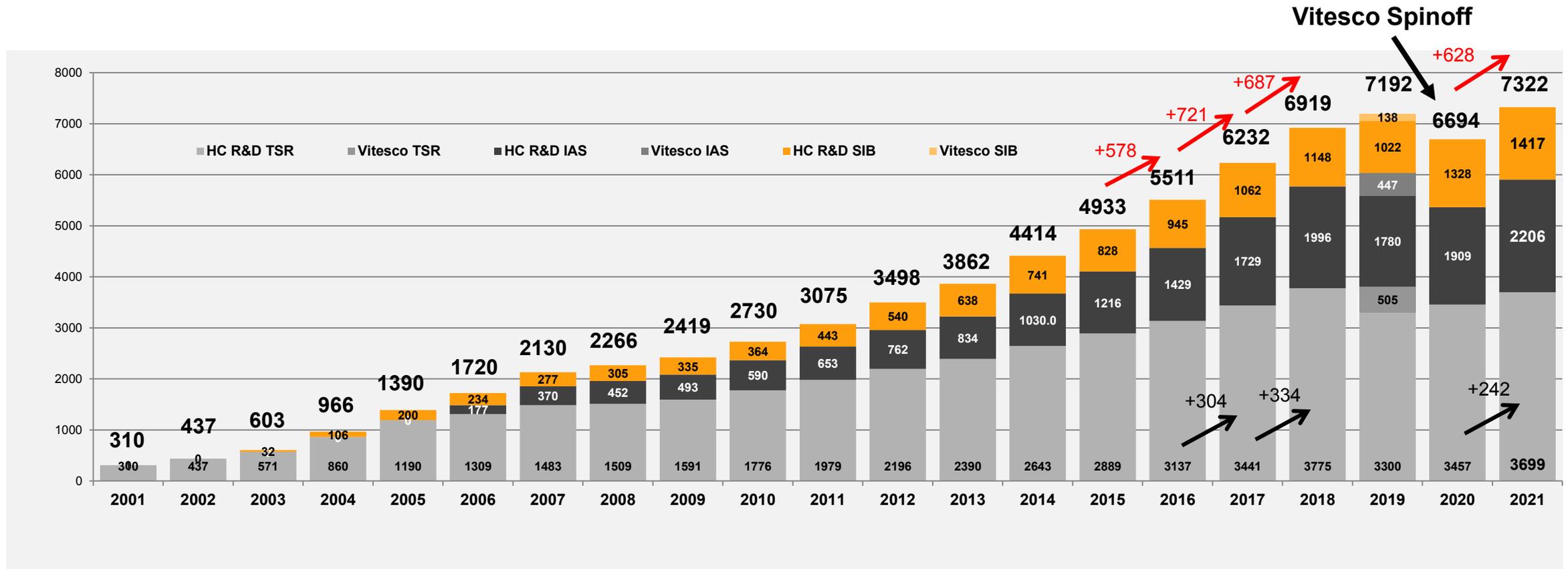
- › Continental Founding Partner and Vice-President
- › Structured involvement in university decisions
- › **Committees** for e.g.
 - › Improvement of curriculum
 - › University strategy (led by Conti)
- › Initiation of **new Masters**: Cyber Security, Machine Learning, IoT, Cloud Computing, Big Data



Founding Ceremony: 22nd of March 2013

R&D + Sh. Serv. Continental Automotive Romania

Evolution of HC 2001 - 2021: 7322 R&D + Shared Services*



*w/o Elektrobit (308 HC) and „Osram“ JV (130 HC)

Key Facts & Figures of Continental Romania

Continental Automotive Romania – Timisoara R&D



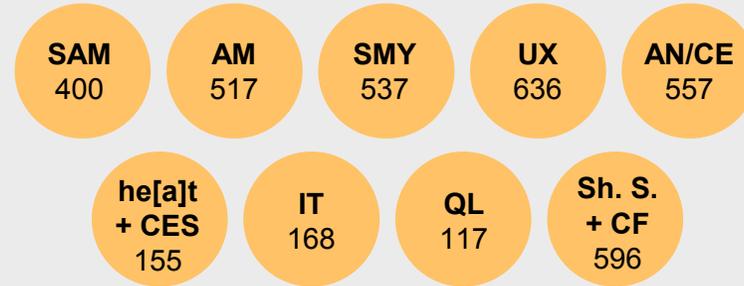
Continental Automotive Romania Timisoara – R&D



Dr. Christian von Albrichsfeld

Opening: 2000-23-03

Employees: 3699 0 (in R&D)

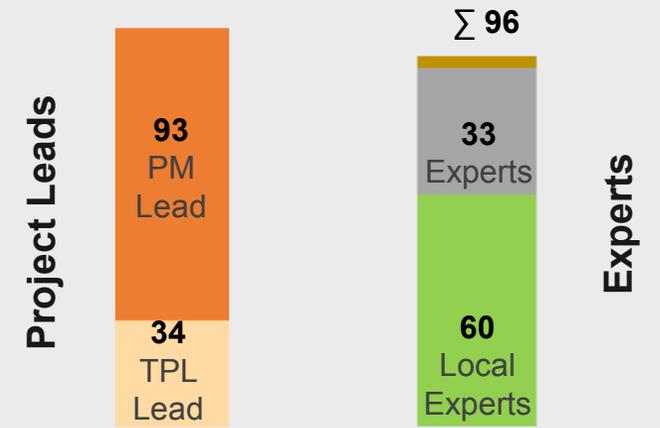
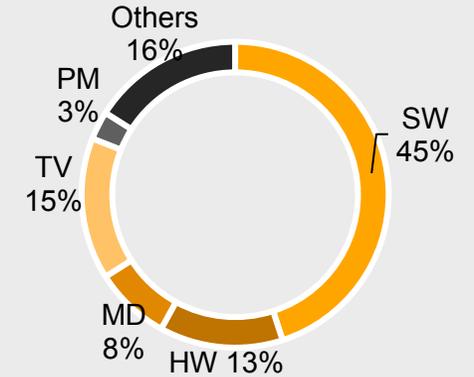


6,6 Years Conti experience	32,4 Years old average	38,6% Female share	32,1% Female in Leadership
---	-------------------------------------	---------------------------------	---

Total investment: 159 Mio €
thereof 2021: 15,5 Mio €

R&D Cost: 184 Mio € (2021: +4 %)

Expertise:



end of 2021

Vision – Where do we see ourselves in the long-term?

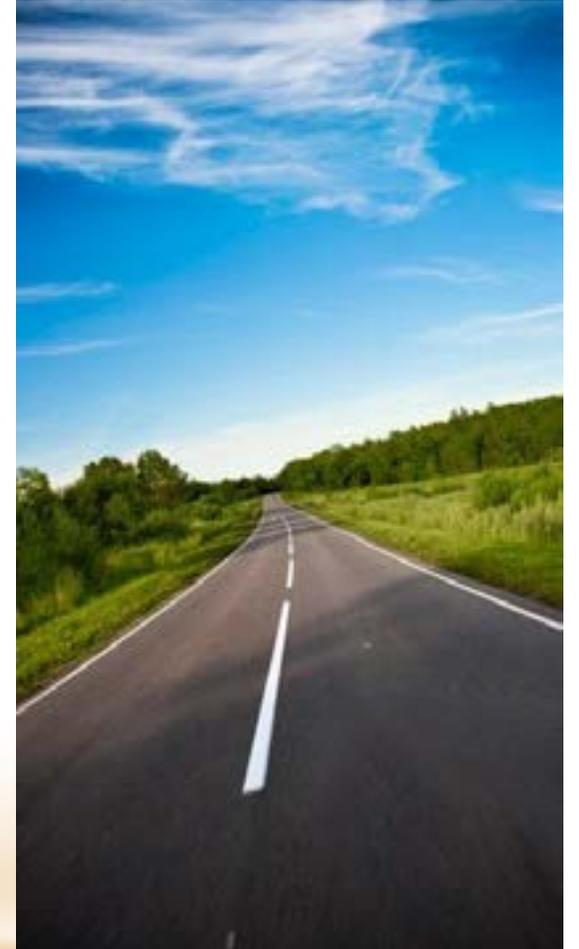
Mission – What is our field of action?

› **Vision:**

The preferred partner for **state-of-the-art smart mobility solutions, products and services**

› **Mission:**

- Create **value** for our **stakeholders**
- Drive **continuous transformation** and **agile processes, methods and tools**
- **Invent, develop, produce and market high quality and efficient solutions** for our **customers**
- Be the **employer of choice** in Romania where through **engagement & enthusiasm** we have the **best specialists**
- Be a **strong, sustainable and active partner** for the **local ecosystem, Universities, Authorities and Society**



Strategic Development of HUB

Anticipate Needs, Use Romanian HUB for Synergies, Communities

Considerations and Constraints:

- › **Young organization** (average age ~ 30 years) with good **engineering abilities**, high **intercultural awareness**, linguistic talent, **enthusiastic, ambitious, flexible**
- › **Fast growing:**
 - › growth of number of people, competencies, and responsibilities
 - ➔ need to **integrate** new team member, keep **fluctuation** healthy, **development and training** of people
- › **“East Europe” Environment:**
 - › Long term development of ecosystem needed

- ➔ **Anticipate Business and Market Needs** especially **Growth and Competence** → Timeline: Stratplan + x
→ **Adapt Strategy:** Communication, EBR, University, Talent Attraction, Competencies, Onboarding, ...
- ➔ **Use synergies** between different BUs:
common development, training, communities, best practices, information exchange, inter-BU career path
- ➔ **Develop locations very systematically** by target setting & close monitoring
- ➔ **Strive to increase work efficiency** by increasing local responsibility and reducing interfaces to other locations
→ **reduce extended work bench** mode of work,
go to **full projects** and **world-wide competence centers**

R&D Timișoara

2022 Strategic projects

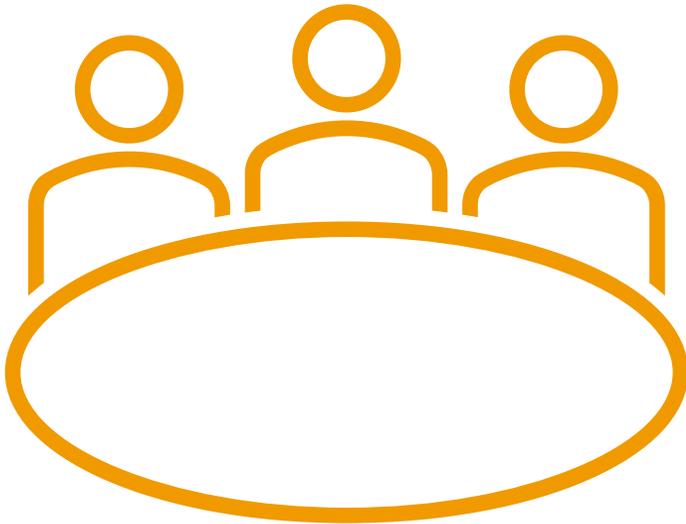
	Project Name	Alignment to he[a]t JM#	CMT Sponsor	PM
	Manager Growth	JM#7 - Provide Organizational Stability and Growth in HC & responsibilities	Peter Kovacs	Septimius Petric, Denisa Andriescu
	Competency Management	JM#7 - Provide Organizational Stability and Growth in HC & responsibilities	Ciprian Bleoju	Claudiu Bostina
	Engineering Communities for Practice Sharing	JM#6evo - Establish Practice Sharing in our DNA	Andrei Son	Oana Carebia
	Hybrid Work	JM#2 - Create Effective Hybrid Work Environments	Cristian Enculescu	Adrian Radu
	RPA	JM#1 - Elevate Efficiency in he[a]t Locations via RPA@R&D	Aurel Stanciu	Daniela Pârva
	Organizational resilience in projects	JM#4 - Ensure stability in projects & Fluctuation resilience	Ciprian Samfescu	Ciprian Samfescu

Heat HR TSR Highlights 2021



HEAT HR TSR

Top Ongoing Projects and Challenges for 2022



- › Digitalization in HR
- › Employee engagement
SHAPE Project
- › Agile Recruiting process
- › Continental National Recruiting
Event (RO level)
- › Manage Growth - Target of
gross total hiring is: 822
- › Employee retention (key
competency, know – how)
- › Inflation

Our Basics Live 2021

Global vs. Ro. vs. TSR

- > Romania Values better than Conti Values
- > Romania 2021 only slightly lower than 2020

RESULTS FOR CATEGORIES



In a Nutshell

Contribution to Automotive and he[a]t Strategy

In Timisoara and Romania Automotive Employees innovate, develop and produce mobility solutions for a safe and connected world, and contribute to all Strategic objectives in all Strategic action fields

Foster **Agile mindset** in management and organization

Introducing **Agile Roles** and **Master Job Profiles**

Growth in HC and **Responsibilities**

Piloting **R&D-Efficiency Increase** with **RPA**

Support **SW Excellence** with **LM ASPICE Initiative**

Piloting **Agile Transformation** in Projects

Working Actively on **House of Solutions**

Further strengthen position as **Employer of Choice**

Establish **Communities** for Knowledge Sharing and Learning

Increase **Operational Excellence** with **Best Practice Initiative**

Our Management Team

Country Head & General Manager

Engineering Site
Timisoara

Dr. Christian von Albrichsfeld



Business Units

Autonomous Mobility
Romania

Simona Belea



Safety & Motion PSS
Romania

Cristian Enculescu



he[a]t CES

Sorin Iarca



Central Technologies

Cristian Gavrilescu



Architecture & Networking

Ciprian Samfescu



Smart Mobility
Romania +

Sasha Cioringa



User Experience

Peter Kovacs



Central Functions

IT GSS/IT Infrastructure

Honoriu Bonaciu



A. Purchasing Hub
Romania, Hungary

Ralf Heyder



Qualification Laboratory
Romania

Ciprian Bleoju



CBS R&D & Innovation

Andrei Son



Human Relations
CAR SRL

Geanina Cioara



Quality/PM Engineering

Alina Ilin



Communications
Romania

Roxana Detesan



Facility & ESH
CAR SRL

Cristian Neculita



Finance/ Controlling
CAR SRL

Aurel Stanciu



Agenda – Day 1

Mo April 4th (2-4pm CET)

Topic	Details	Duration	Responsible
Welcome and Agenda	Welcome, Agenda	5 min	Christian von Albrichsfeld + team
Location presentation	Presentation of location, organization, strategy, strategic focus and people topics, ...	20 min	Christian von Albrichsfeld + team
Virtual location tour / marketplace BAs + QL lab	BA Presentation SAM PSS	1h 25 min + 5 min break	Cristian Enculescu + team
	BA Presentation UX		Peter Kovacs + team
	BA Presentation CE/AN		Ciprian Samfescu + team
	BA Presentation SMY		Bogdan Troie + team
	QL Tour		Ciprian Bleoju + team
	BA Presentation ADAS		Simona Belea + team
Closing 1st day		5 min	Christian

He[a]t Virtual Visit @ Continental Romania Timisoara 2nd Day

Agenda – Day 2

Tue April 5th (2-4pm CET)

Topic	Details	Duration	Responsible
Virtual location tour / marketplaces: Shared Services / horizontal functions / local he[a]t	Presentation overview of the different activities including organization, Highlights, projects, connection points ..	55 min	Christian von Albrichsfeld + team
	I2 Presentation		Andrei Son
	CES		Sorin Iarca + team
	he[a]t CT general		Cristian Gavrilescu
	he[a]t CT A&S (SWT, EEA)		Cristian Gavrilescu
	he[a]t CT SW-Academy Europe		Krisztina Fitu
	he[a]t CT Microelectronics UPT		Aurel Gontean
	he[a]t CT PMT		Laurentiu Saceleanu
Break		5 min	
Timisoara Location in the ww he[a]t LM context	Presentation	5 min	Jürgen Heim
CTO and selected he[a]t Leaders' presentations	Presentation Gilles Mabire + selected Team members	30 min	Gilles Mabire + Michael Hulsewies + Uwe Schumacher + Jan Hoffmann + Corina Apachite
Discussion and Wrap-up	Open discussions he[a]t leaders with location leaders	25	All

Our Management Team

Country Head & General Manager

Engineering Site
Timisoara

Dr. Christian von Albrichsfeld



Business Units

Autonomous Mobility Romania	
Simona Belea	
Safety & Motion PSS Romania	
Cristian Enculescu	
he[a]t CES	
Sorin Iarca	
Central Technologies	
Cristian Gavrilesu	

Architecture & Networking	
Ciprian Samfescu	
Smart Mobility Romania +	
Sasha Cioringa	
User Experience	
Peter Kovacs	

Central Functions

IT GSS/IT Infrastructure	
Honoriu Bonaciu	
A. Purchasing Hub Romania, Hungary	
Ralf Heyder	
Qualification Laboratory Romania	
Ciprian Bleoju	
CBS R&D & Innovation	
Andrei Son	

Human Relations CAR SRL	
Geanina Cioara	
Quality/PM Engineering	
Alina Ilin	
Communications Romania	
Roxana Detesan	
Facility & ESH CAR SRL	
Cristian Neculita	

Finance/ Controlling CAR SRL	
Aurel Stanciu	

Global Shared Services Timisoara

~800 employees delivering high class services worldwide



Achievements we generated together



Automotive **Accounting** Service Center
Global Business Center ContiTech

60 HC

83 HC



Controlling Service Center
(Automotive+ContiTech)

89 HC



Automotive Payroll Shared Services
Automotive+Corporate **HR** Shared Service

17 HC

58 HC



Automotive **Purchasing** Shared Services
ContiTech GBS **NPM** HUB

115 HC

32 HC



IT HUB Europe

184 HC



Automotive **Quality Laboratory**

86 HC



Intellectual Property & Law

7 HC



Translation Center Romania

8 HC



IMDS

11 HC



Travel Management Center

9 HC

TEAM = Together Everyone Achieves More

Organization A O IT Timisoara



Honoriu Bonaciu

Automotive IT

Group IT



IT Location TSR

IT Center Europe

IT Romania

Services and Headcount

 People: 200

SAP	Infrastructure	Eng. Support	Development	Local IT
Global Leaders	Executives	Average Age	% Females	
9	1	35	35.6%	

 Work content:

Support	Consultancy	Complete Projects	Others
25%	46%	25%	4%

Global Projects coordination

- 15 IT PMs from Timisoara
- Service owners** for Git Based Services, DOORS, MATLAB, IMS, MKS, Autodesk Moldflow, MCAD Library, MKB Simulation
- Technical Service Owners** for global IT services (Client OS, Security, Networking)
- Technical Leads** for global IT services (Client OS, SharePoint, Asset Management, Antivirus, etc.)
- Technical experts** for global IT services (Networking, Office 365, Security, Identity Management, Storage, etc.)
- A O IT Senior Cybersecurity Expert



Key as a service, cloud infrastructure



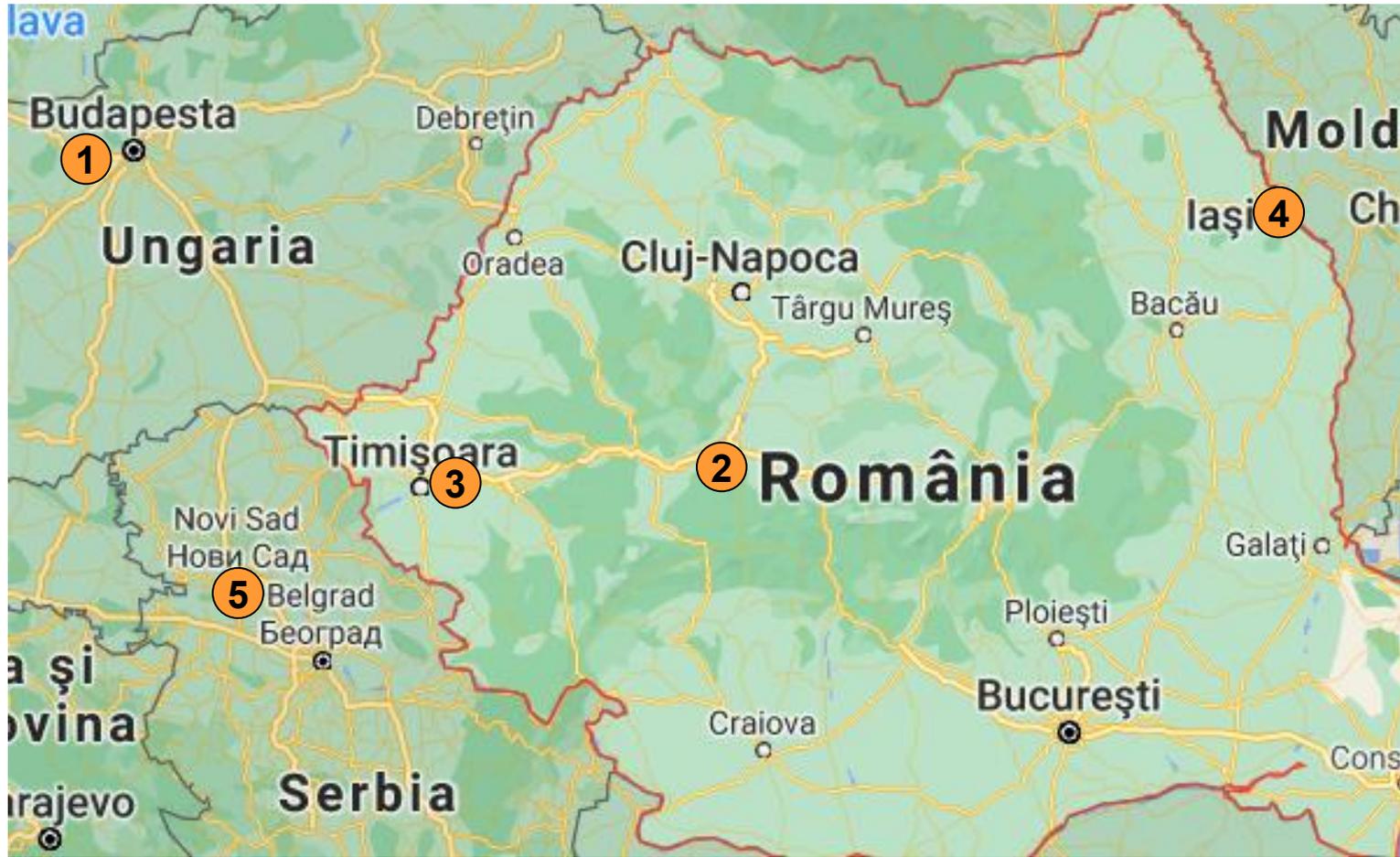
- IT Regional Coordinator & IT PMs** for all East European locations.
- Solution owners** in various areas (e.g Proc, Pur, QM & EHS, PM, AC, BW, SD etc)

› Consultancy and Support:

- Engineering Applications** for Europe Systems and Software Engineering (Jazz, GitHub, DOORS, IMS, MATLAB)
- Product development (WISE, MCAD)
- Customer and Supplier Integration (B2B Portals, Partner Room)
- Electronic Engineering (ECAD Library))
- Business applications:**
 - › **SAP support/consultancy for East Europe** (BW/BI, FI, CO, PS, SD, IW, PP, PM, MM, QM)
 - › **Special Applications – WEB development** (eSign, Resources Balancing Tool, ODW, Customer Rating, CART, BPAT, Recording Hours, New Product Launch etc.)
- Cybersecurity**
 - › **PenTest, Forensic Analysis**
- License Management**
- Mergers & Acquisitions**
- Project Management Support**
- Consultancy** Cloud infrastructure for all Continental business areas.
- Process and commercial management** A O IT Infra Autonomous Mobility
- Operating systems, networking and servers** (Win10, O365, Network & Voice)
- Technical Leading** for Infrastructure topics (Windows & Linux client; VDI; QIP)
- SAP HR systems** (RO and HU) and **Collaboration Platform** (ConNext, Sharepoint, etc.)

Overview A PUR HUB HU_RO_SRB

Locations Served



1 **Budapest, Hungary**
Electronic Manufacturing:
Employees: 2.220
Plant manager: Dr. Robert Keszte
FF VNI (CCN, HMI, CVS): Balint Balogh
FF VED (ECU + HCU): Zoltan Dapsy
FF ETCM: István Molnar
Quality: Andras Meszaros
SCM: Lajos Imre

2 **Sibiu, Romania**
Engineering Center
Employees: 1.150
Electronic Manufacturing:
Employees: 2.350
Plant manager: Sonok Rivetto
FF CCN: Claudiu Dima
FF ADAS: Sergiu Andrici
SCM: Adina Manitiu
Quality: Radu Sterp

3 **Timisoara, Romania**
Engineering Center
Employees: 3950
Electronic Manufacturing:
Employees: 1850
Plant manager: Dr. Ralf Luchs
FF ID: Juan Carlos Gil Gonzales
FF PSS: Liviu Almajan
SCM: Michael Petri
Quality: Bogdan Dragota

4 **Iasi**
Engineering Center
Employees: 1920 (R&D: 1771)

5 **Novi Sad, Serbia (SOP 2021)**
Inhouse Molding, Electronic Manufacturing, BU HMI
Plant manager: Edwin van der Kaa
SCM: Sonya Babeu
Quality: Bojan Veselinovic
FF Electronics: Aleksic Aleksandar
FF Plastics: Karan Goran

Key Facts & Figures of Continental Romania

Purchasing HUB HU_RO_SRB

Main Functions HUB:

1. Handling PM for HUB plants
2. Hosting all A PUR functions

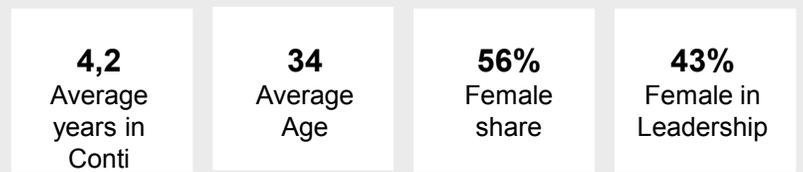
Start in Romania: 2005

Automotive Purchasing



Ralf Heyder
Head of A O PUR HUB HU_RO

Employees 140 + 11



Basic Information

- Key Country for PUR and SQM
- HC increased by 100% the last 4 years
- TSR, SIB were defined as strategic location for CP in Europe (transfer from HC to BC)
- Recruiting: 38 HC hired, net increase: 20 HC
- Fluctuation was stabilized end of 2021

Main Figures PUR HUB

- Plants: Budget PVO 2022: 1,9Bn€
Sourced LT PVO 2021: 1,4Bn€
- BA AP HUB: LT PVO 2021 0,46Bn€
LT PVO 2020 1,8Bn€
- CP: PVO for APN 382Mio€
Coach f. #133 suppliers
- CVA: Cost reduction 20,4Mio€
- PEES: PVO 2021: 253Mio€, 8.5% red.

Quality R&D Highlights

 People: 43



Group QCE	Automotive Quality & Environment		Heat LM	Automotive Sustainability	Group Health & Safety
10 HC	Classification Solutions 1 HC	QKAM 19 HC	3 HC	IMDS 6 HC	HASUMA 4 HC

Recognized Experts	Executives	Average Age	% Females
1	0	30	68

Activities:

IMDS = International Material Data System
HASUMA = Hazardous Substances Management
QKAM = Quality Key Account Management
QCE = Quality, CBS and Environment
LM = Location Management

HIGHLIGHTS

- › **He[a]t Location Management:** active contribution in definition, roll out and implementation of Joint Mission projects
 - JM#7 - Location Management Metrics - KPI Framework
 - JM#8 - Foster Local Process Discipline ASPICE - support BA/BU ASPICE targets
 - JM#8 evo - Excel in Sustainable ASPICE Performance
- › **QCE (former TQM) Hub** installed in Timisoara
- › **Sponsor** for high impact **communities** at R&D Romania Level (Q / PM / ASPICE Assessors / FSM)

Communities (Sponsored by R&D Quality Organization) Team Up in Expertise for more than a Decade

Quality Community

Since 2008

Members: quality managers in projects, quality engineers

Project Management Community

Since 2008

Members: project managers, technical project leaders, discipline projects leaders

ASPICE Assessors Community

Since 2010

Members: Certified ASPICE Assessors
Linked to the International ASPICE Community
(Intacs – International Assessor Certification Scheme)

Functional Safety Management Community

Since 2011

Members: colleagues who activate in functional safety area or want to develop their FSM knowledge.

PURPOSE:

knowledge and experience sharing cross BAs / segments

HOW:

meetings, Connext communities, conferences, Gate4SPICE events



Quality Forum



PM Forum



Gate4SPICE



FSM Days

Agenda – Day 2

Tue April 5th (2-4pm CET)

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Continental Automotive in Romania

Romania Highlights / Challenges

