

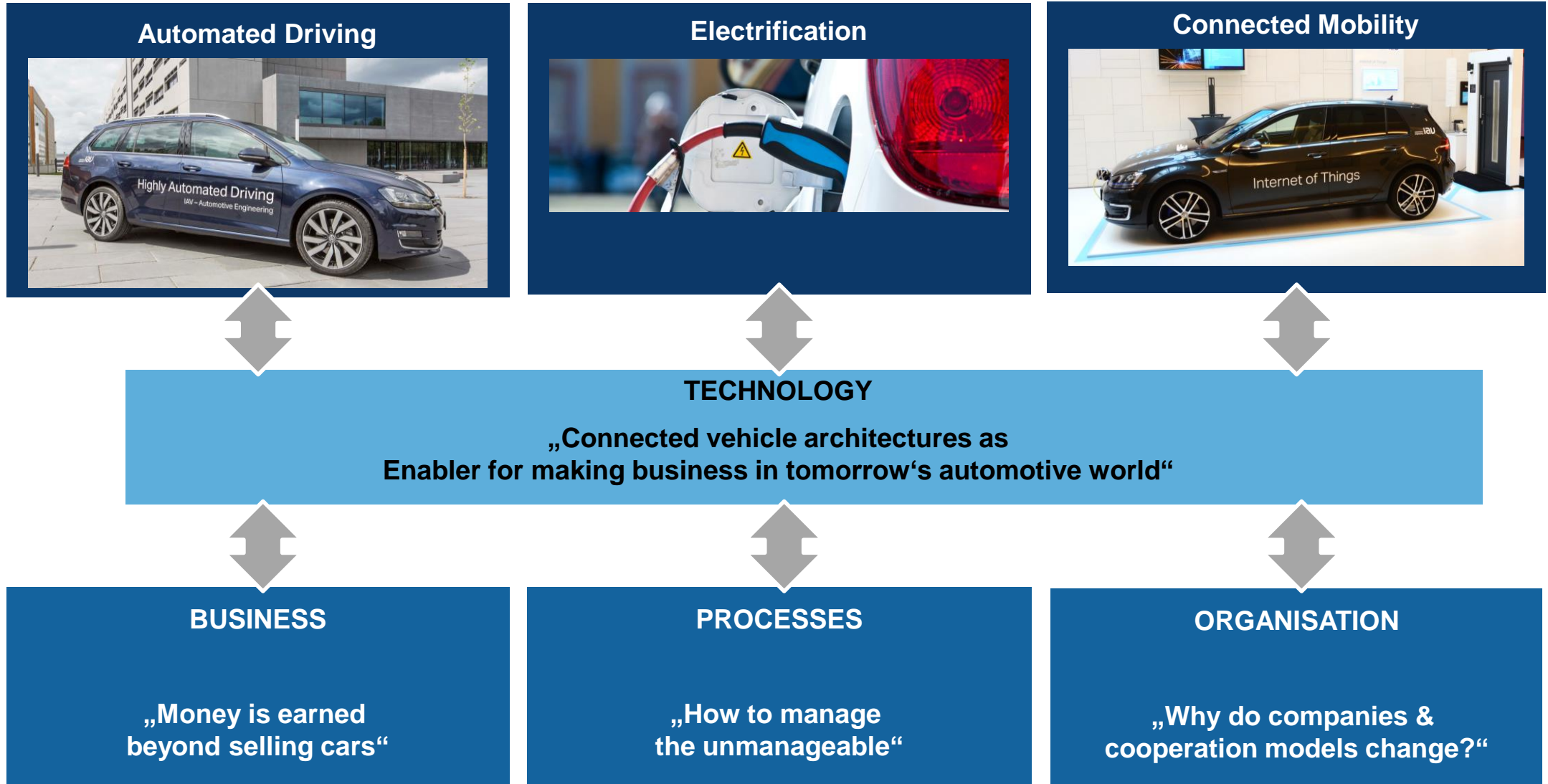


Connected Vehicle Architectures

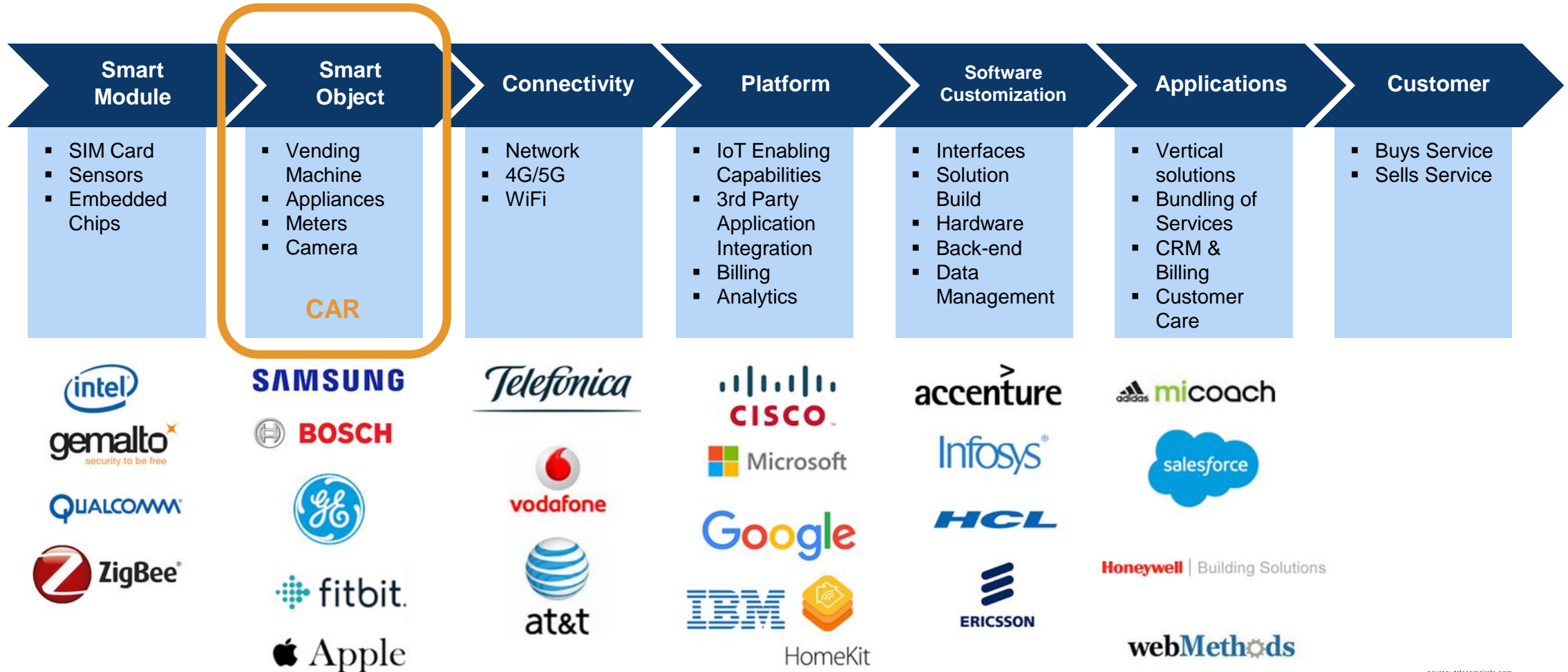
Enabler of Automated Driving and Future Mobility Services

Dr.-Ing. Stefan Koenig, November 2018

Megatrends cause a Paradigm Change in Automotive Electronics

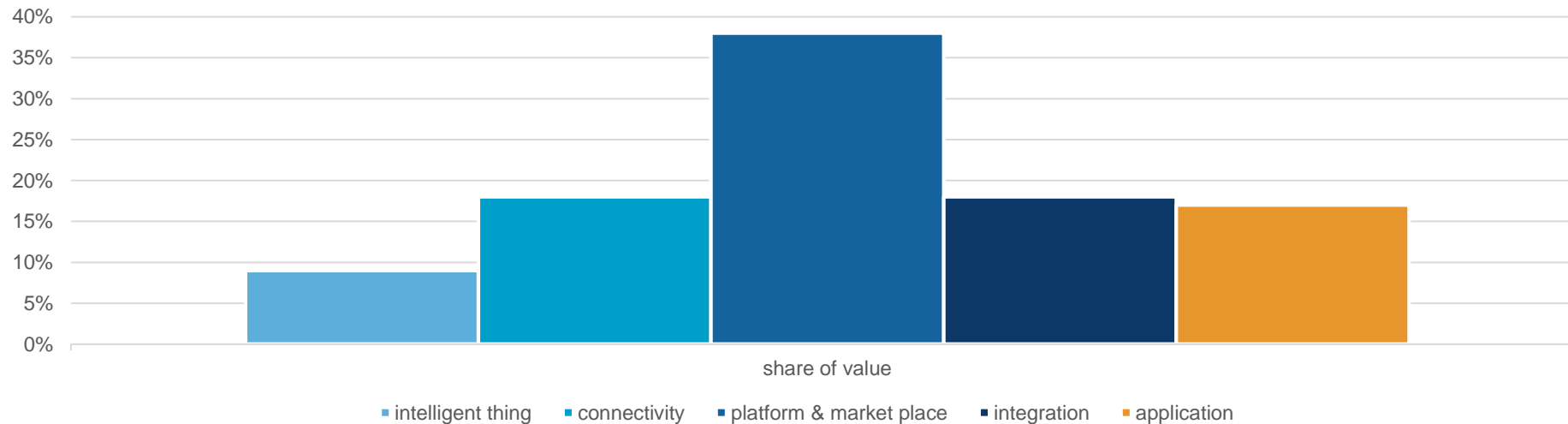


BUSINESS: "Money is earned beyond selling a car!"



source: telecomcircle.com

BUSINESS: “A lot of money is earned beyond selling a car!”



<https://www.linkedin.com/pulse/business-models-internet-things-mohit-agrawal>

- Major value will be gathered beyond vehicle production, classic service & sales
- Cars as „intelligent things“ have to integrate *seamlessly and flexible* into the digital value chain

TECHNOLOGY: “How to prepare for being part of the digital value chain”

Requirements

availability

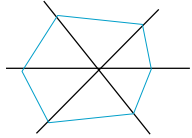
security

safety

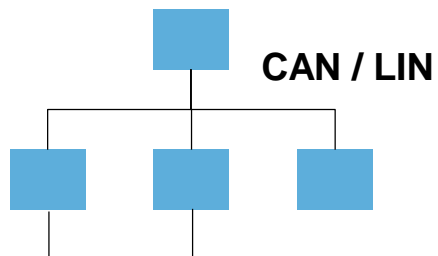
...

+ flexibility

extensibility **+**

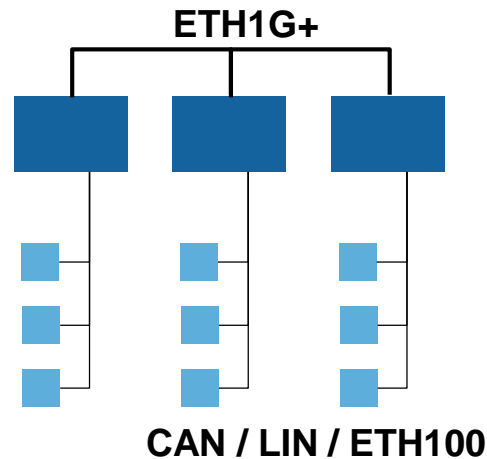


Decentralized Network



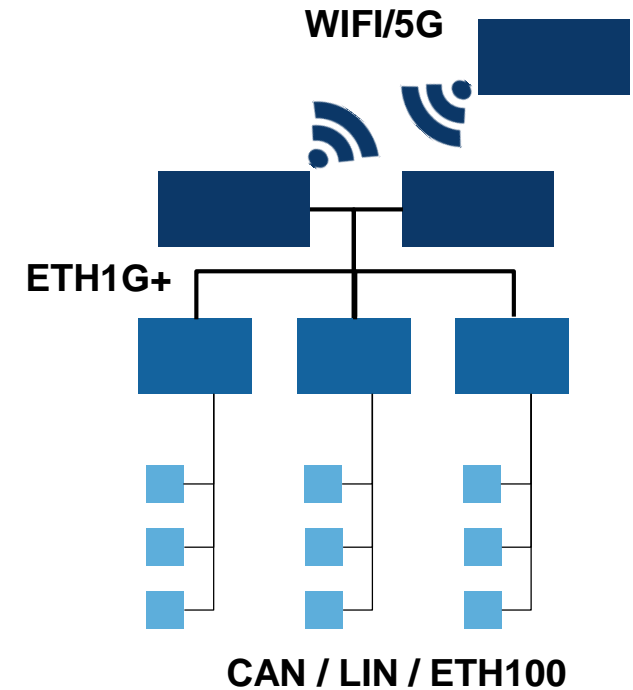
Decoupling for more flexibility
(e.g. updates & bug-fixes)

Domain Architecture



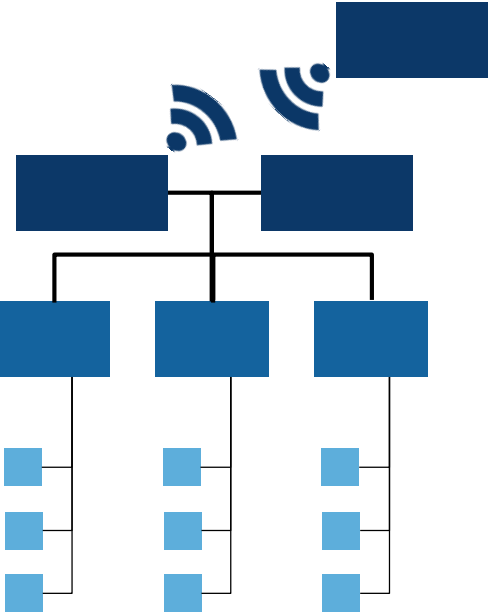
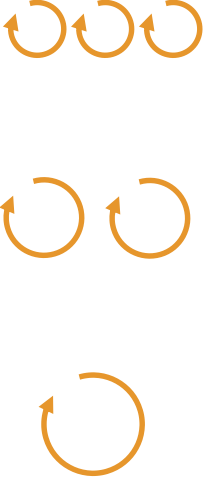

Performance for improved extensibility
(e.g. ecosystem integration, 3rd party apps)

Three-Layer Architecture



→ Vehicle electronics becomes flexible in order to host 3rd party applications

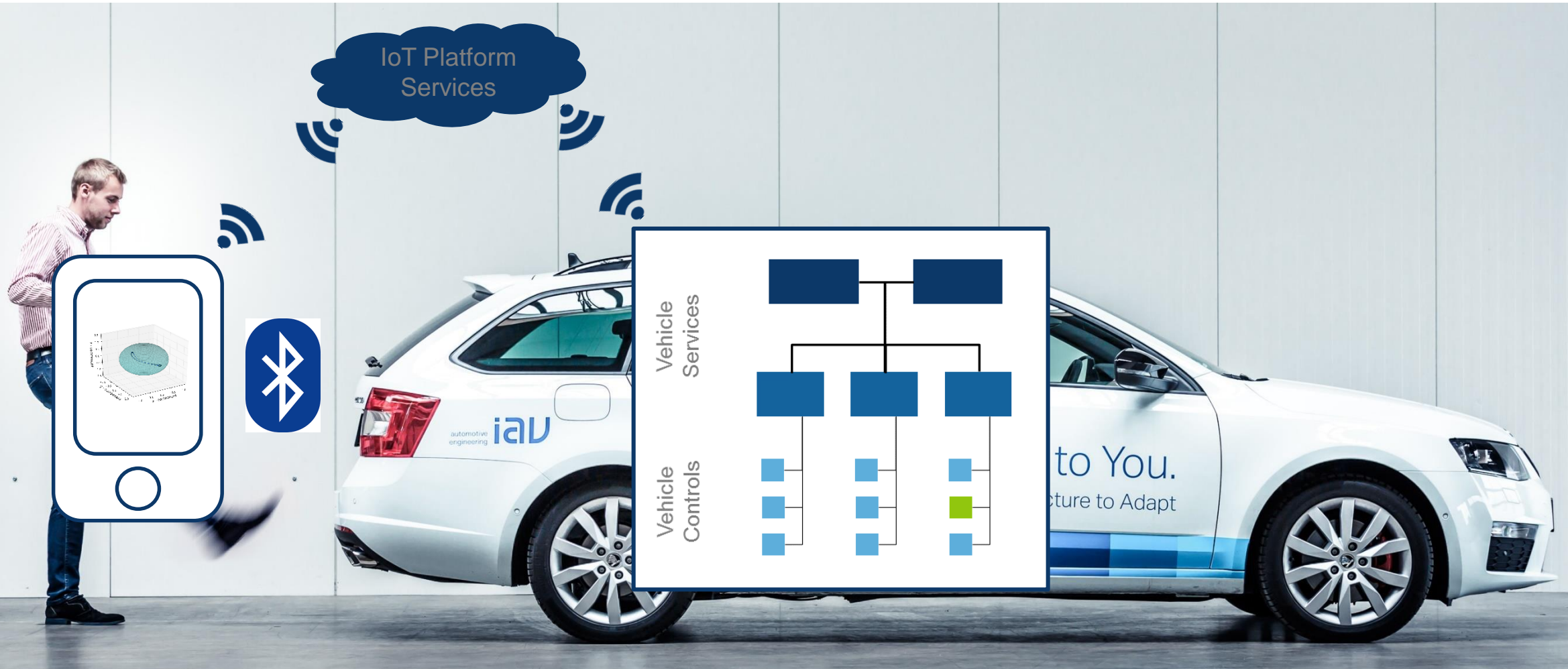
TECHNOLOGY: Properties of a Three-Layer Architecture

Layer	Features	Update Cycles	Timing (upstart & runtime)	Design Pattern
	<p>no I/O, high-level services</p> <p>domain abstraction, integrating low-level controls and high-level services</p> <p>I/O, low-level controls</p>			<p>service-oriented</p> <p>signal-oriented</p>

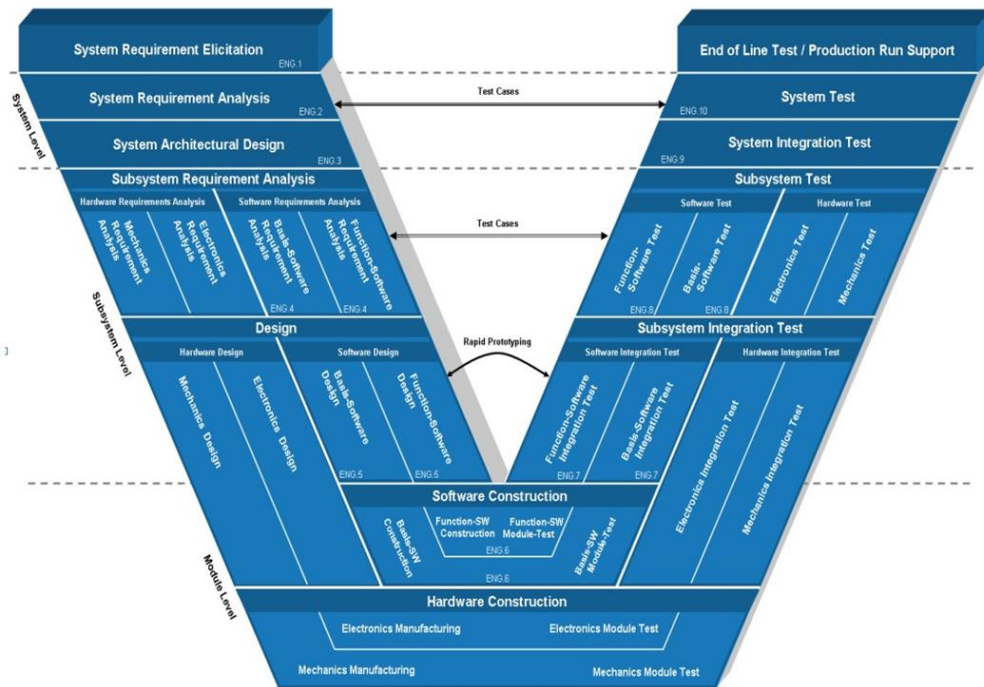
Application Example: “Gesture controlled Trunk” – A Smart Retrofit Solution



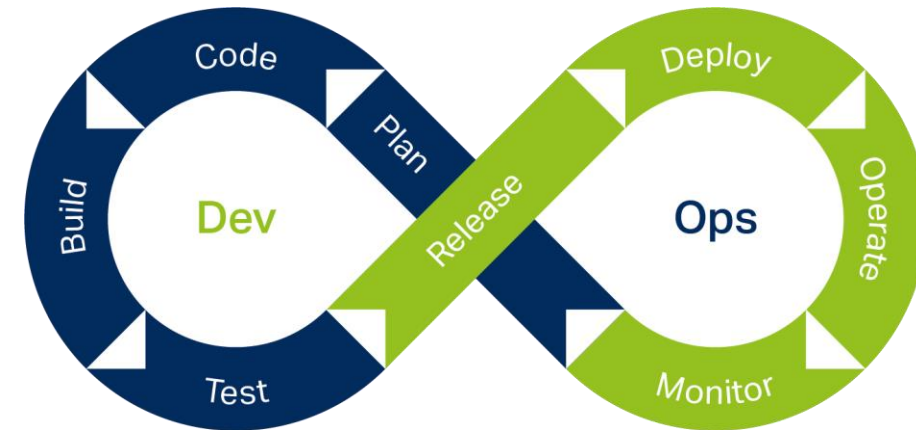
Application Example: “Gesture controlled Trunk” - Smartphone as a Key



Classic product development cycles (e.g. V model)



Continuous deployment according to DevOps philosophy



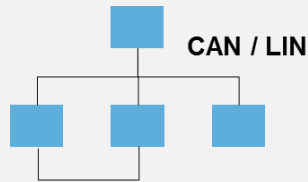
source: suse.com

→ “Classic“ process driven development is intermingled with “IT related“ agile development

ORGANISATION: „Organisations change with new Business“

„Selling cars“

Offline & static
Driven by embedded electronics



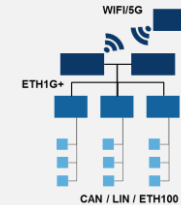
BUSINESS CASE

instant, fixed and one-time ROI
Each stakeholder invests & benefits

Closed Domains & Competition
„I benefit from my investment“

„Making money along the digital value chain“

Connected & flexible
Driven by software applications



BUSINESS MODEL

future and uncertain ROI
Different stakeholders invest & benefit

Cross Domain Eco Systems & Partnerships
„We benefit from our investments“

→ Automotive business will live from cross domain cooperations along the whole digital value chain

It's not only about Cars – It's about Connected Mobility from A to Z!



Automated Driving



Electrification

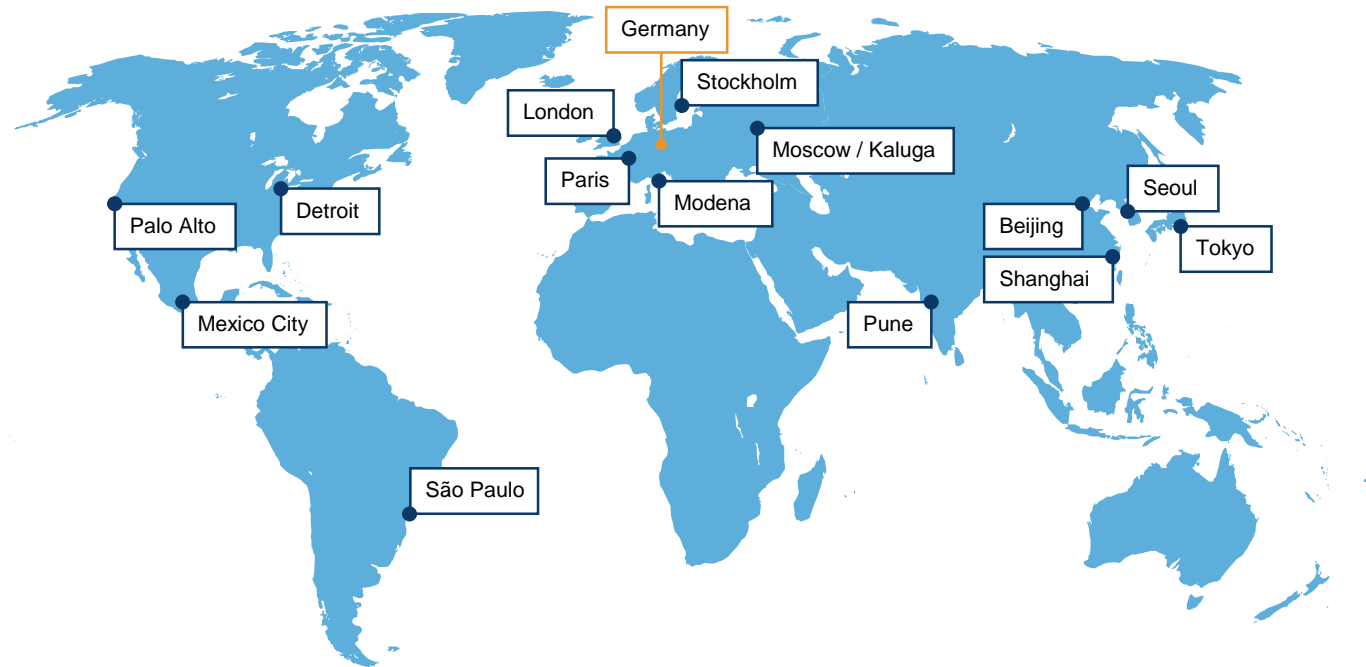


Connected Mobility



→ GOOD TIMES for getting into the game!

... and we are happy to help!



More than 30
sites worldwide



More than 30 years
of experience



More than 6,500
members of staff



More than 68 %
engineers



More than 750 annual
turnover (€ m)

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