future of mobility

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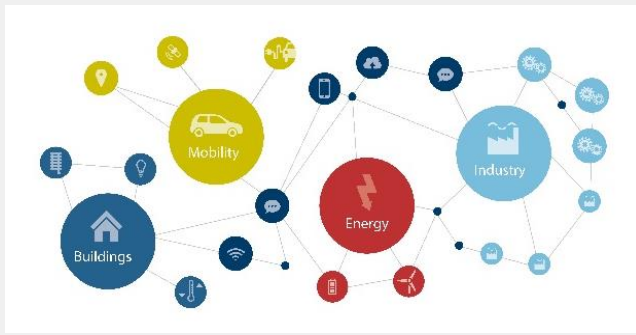
Megatrends
Changes of customer requirements and mobility



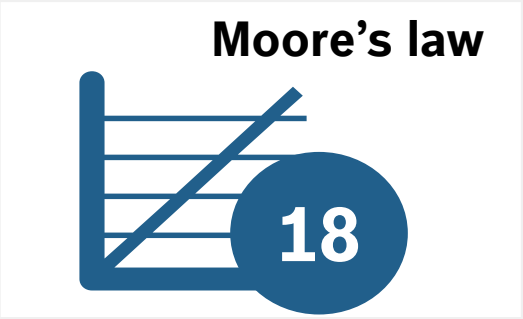
Demography
Average global age will be **33.2** by 2030, 4 years older than today

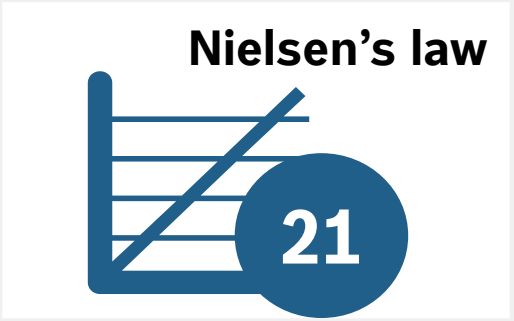
Urbanization
70% of the world's population will live in cities in 2050

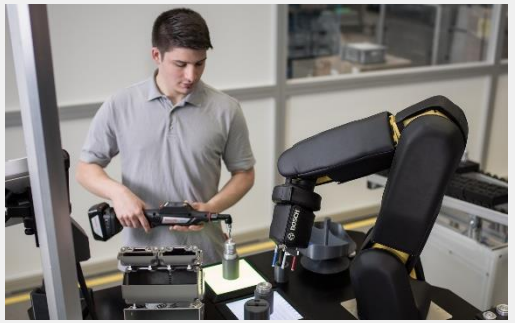
Energy & Climate
30% more energy usage worldwide until 2035

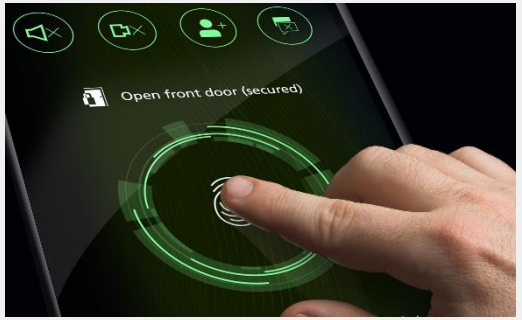
Connected World
50 billion connected things by 2020

Key-Technologies
Push from science and technology developments









Computing

Exponentially scaling also **beyond Moore**

Communication

Tactile Internet
latency, reliability, availability, security

Robotic

autonomous & cognitive systems

HMI

Display applications, **augmented** reality

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THE WORLD IS CHANGING, AND MOBILITY WITH IT.

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Future Mobility
Electrified, automated and connected

costs hybrid e-motor
eBike power electronics

electrified

plug-in eScooter range
fun-to-drive battery
charging infrastructure

legislation driver assistance
emergency braking autopilot

automated

highway-pilot
redundancy sensors
electric steering
valet parking

electronic horizon
smartphone integration

connected

eCall cloud
services fleet management
car2car augmented reality

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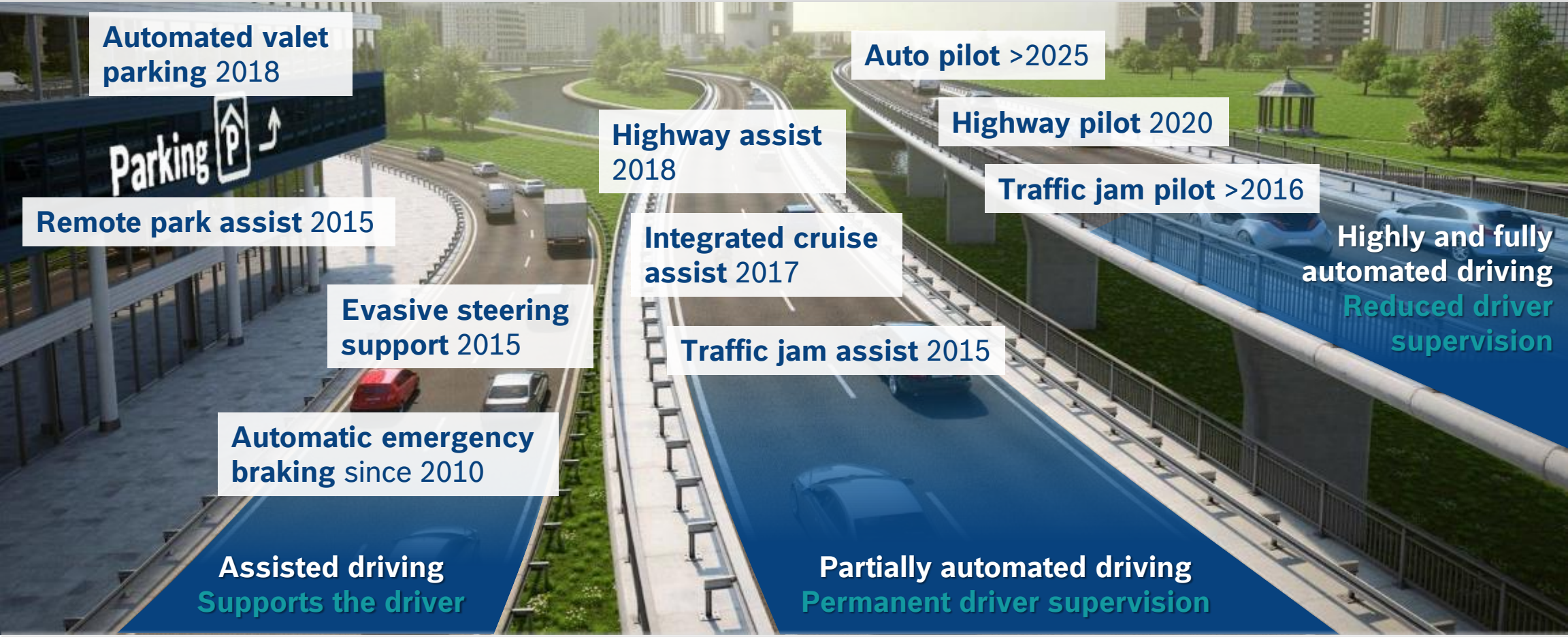
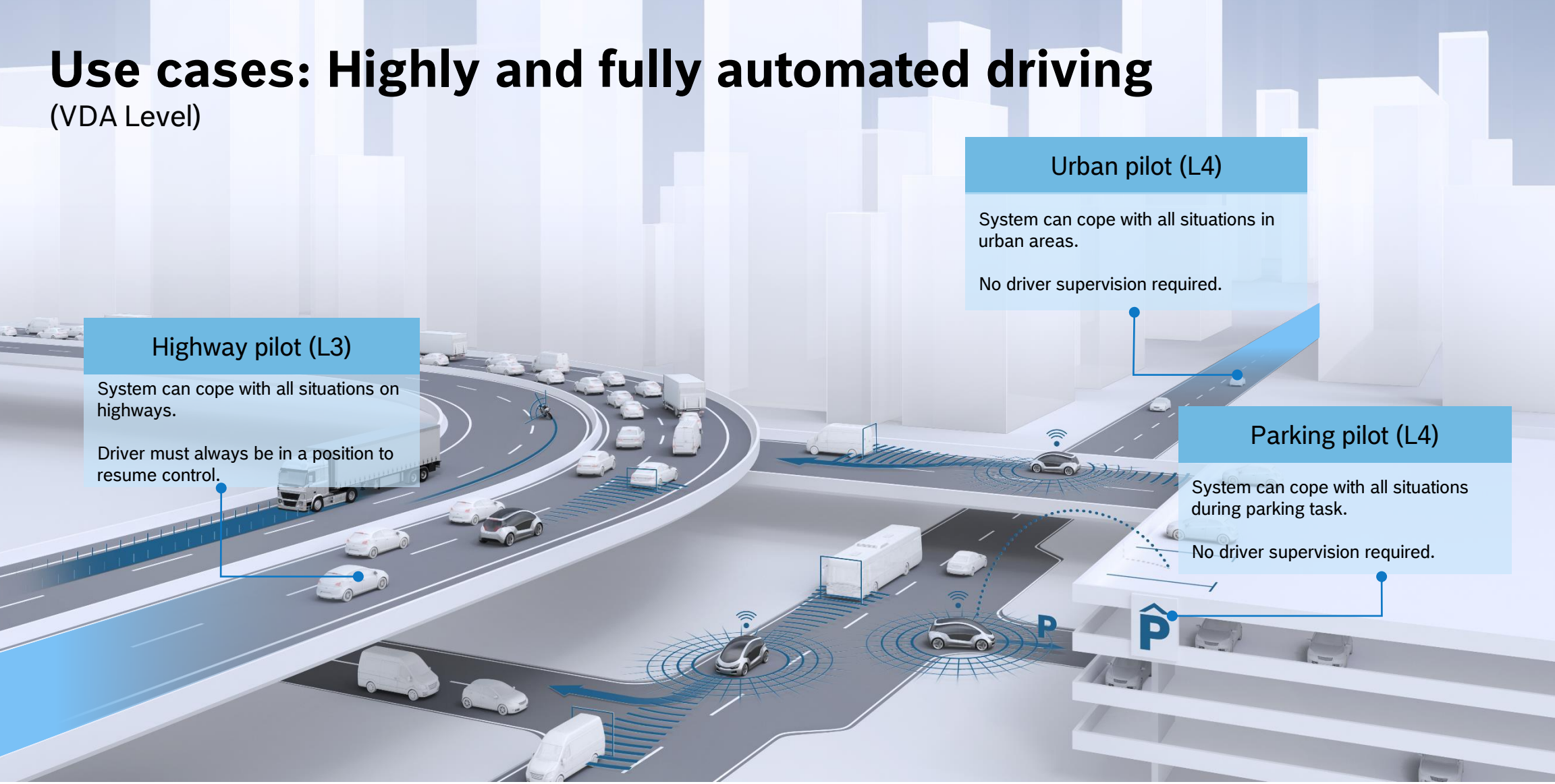
Automated Driving
A revolution coming step by step



Use cases: Highly and fully automated driving

(VDA Level)



Urban pilot (L4)

System can cope with all situations in urban areas.

No driver supervision required.

Highway pilot (L3)

System can cope with all situations on highways.

Driver must always be in a position to resume control.

Parking pilot (L4)

System can cope with all situations during parking task.

No driver supervision required.

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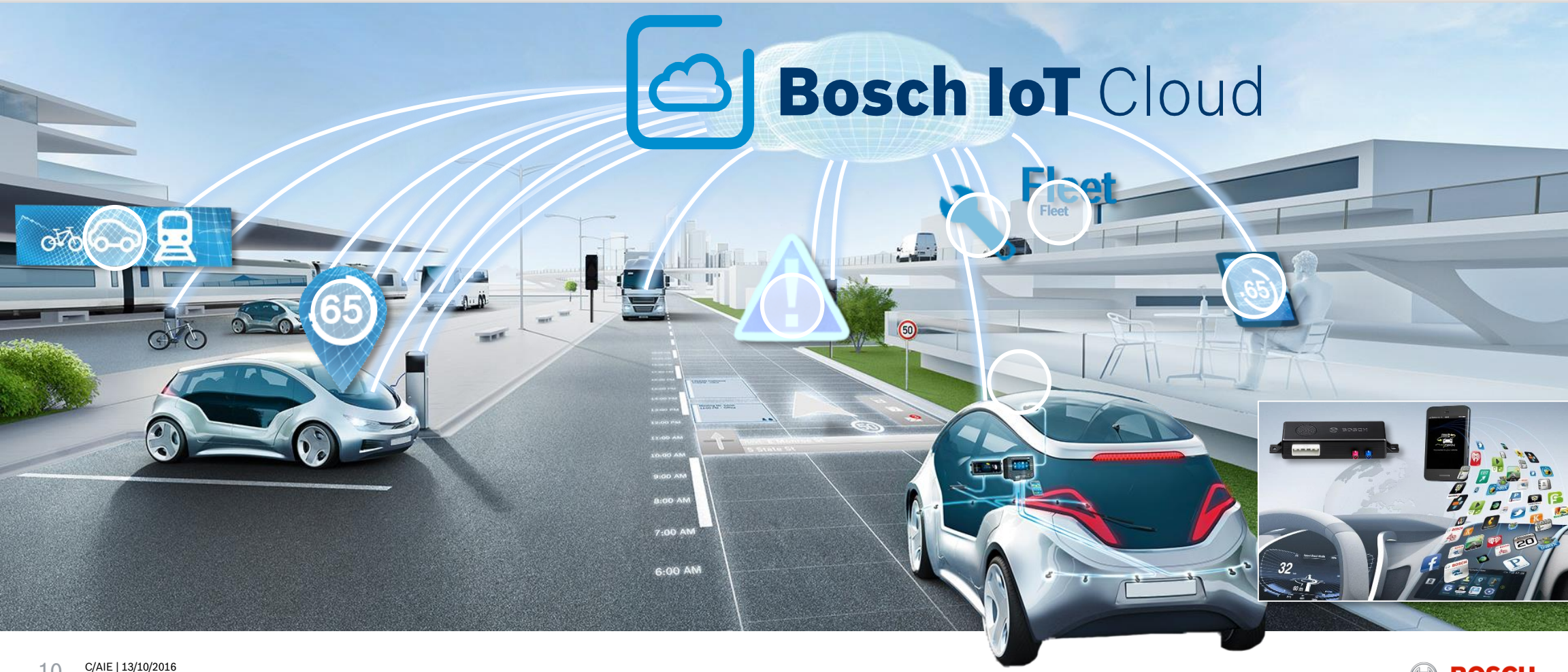
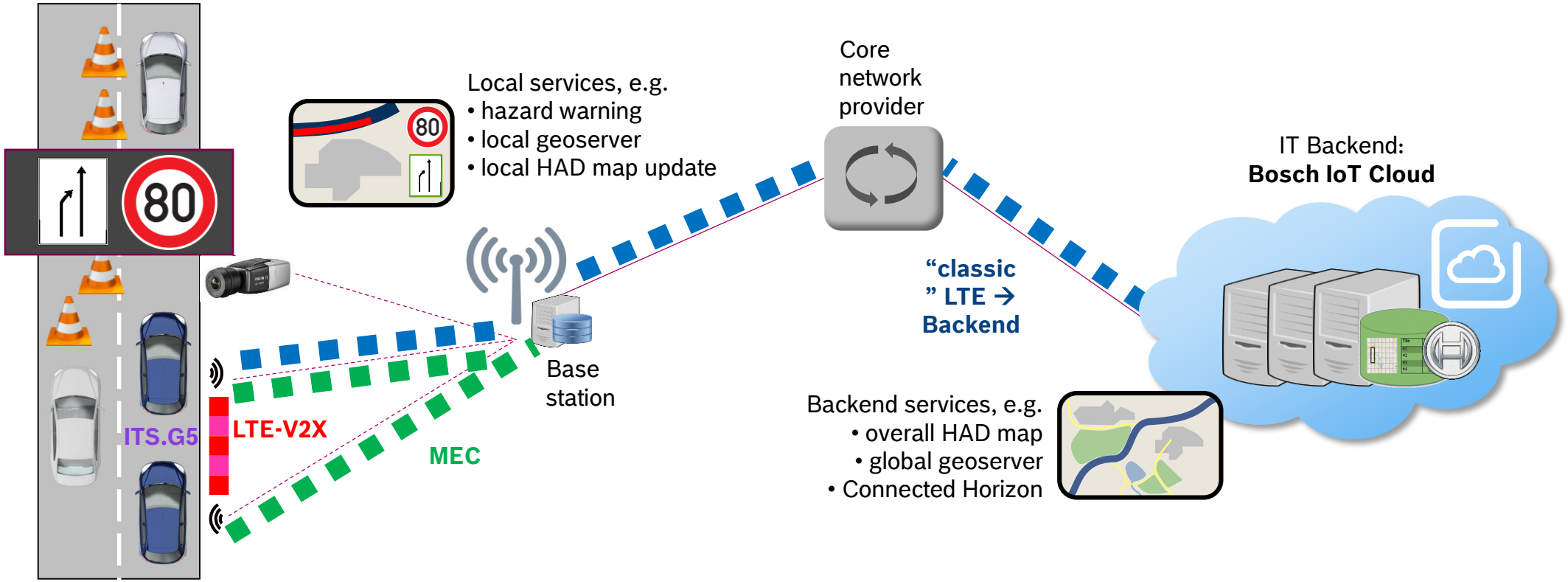
Connected Mobility
Multimodal and online



Towards zero accidents: V2X
Local Cloud PoC - Press Release

http://www.bosch-presse.de/pressportal/en/local-clouds-for-greater-road-safety-63296.html

Towards zero accidents: V2X
LTE, MEC, LTE-V2X & ITS.G5



* MEC: Mobile Edge Computing, on network cloud, LTE-V2X: Direct Vehicle/Car2X comm. on LTE band (X=Vehicle/Infrastructure/Person), ITS.G5 Direct V2X comm. via wifi standard IEEE 802.11p

User-centric E/E architecture

Customer journey

User expectation with regard to future E/E architecture:

(data) security

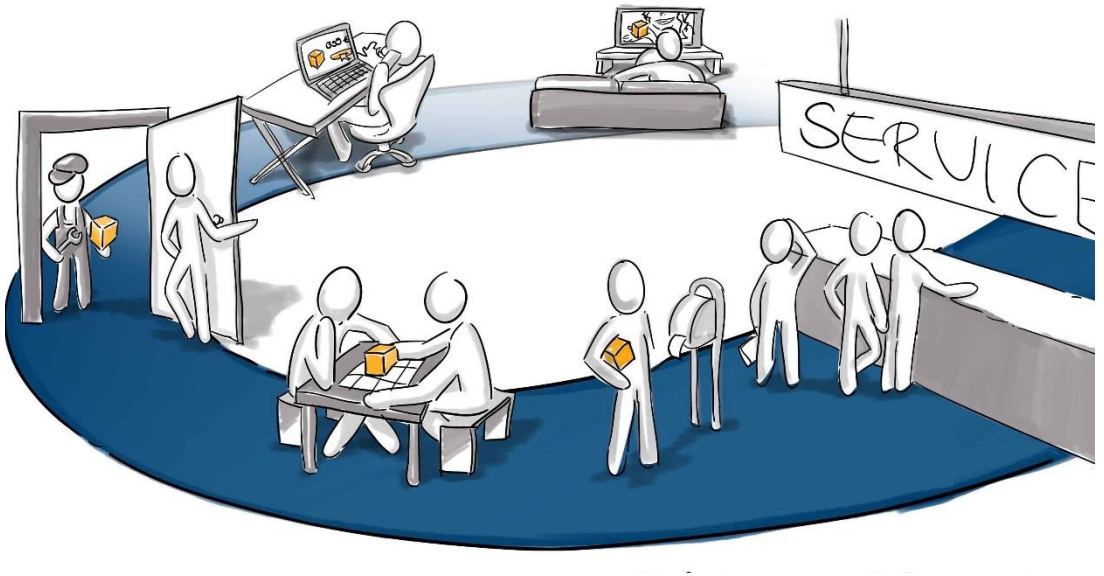
safety

seamless

update capability

resource-efficient

comfortable



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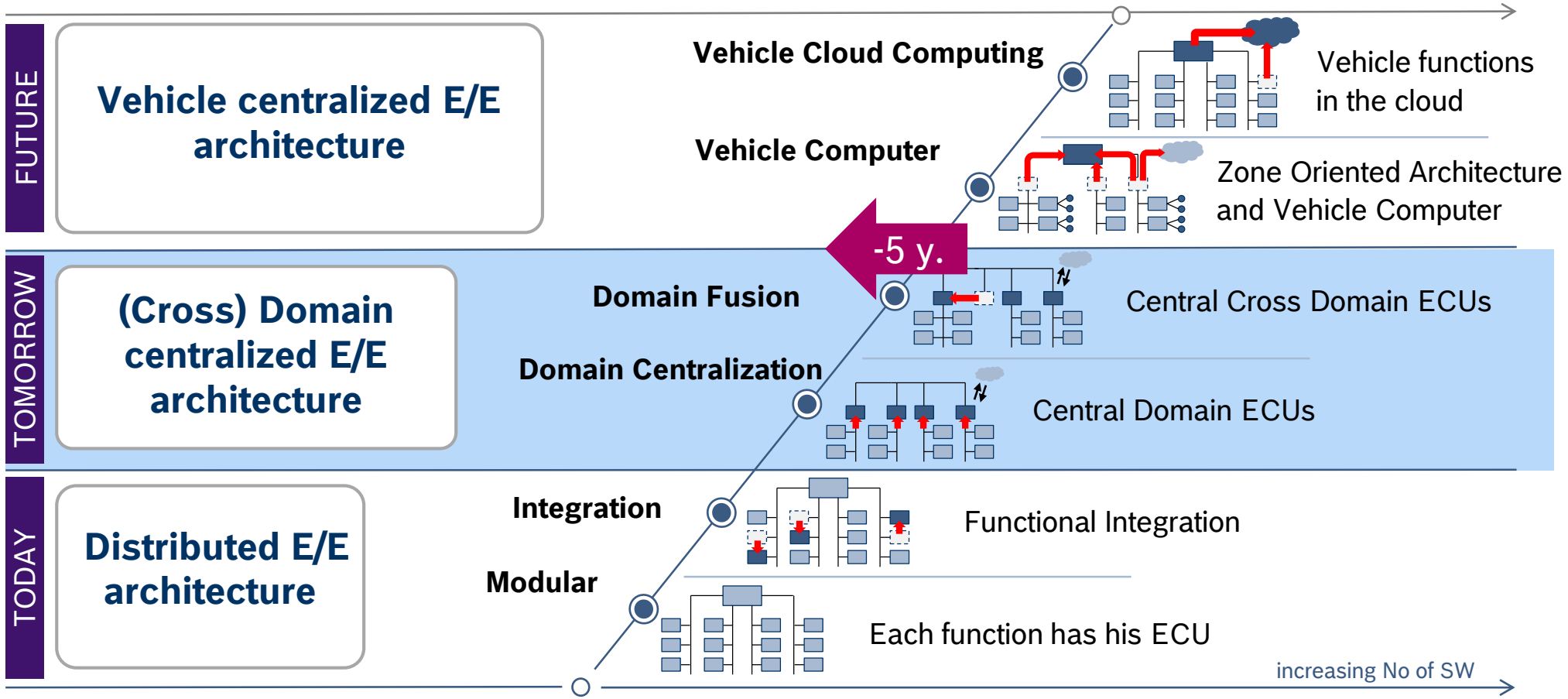
User-centric E/E architecture
From domain-based to central computing

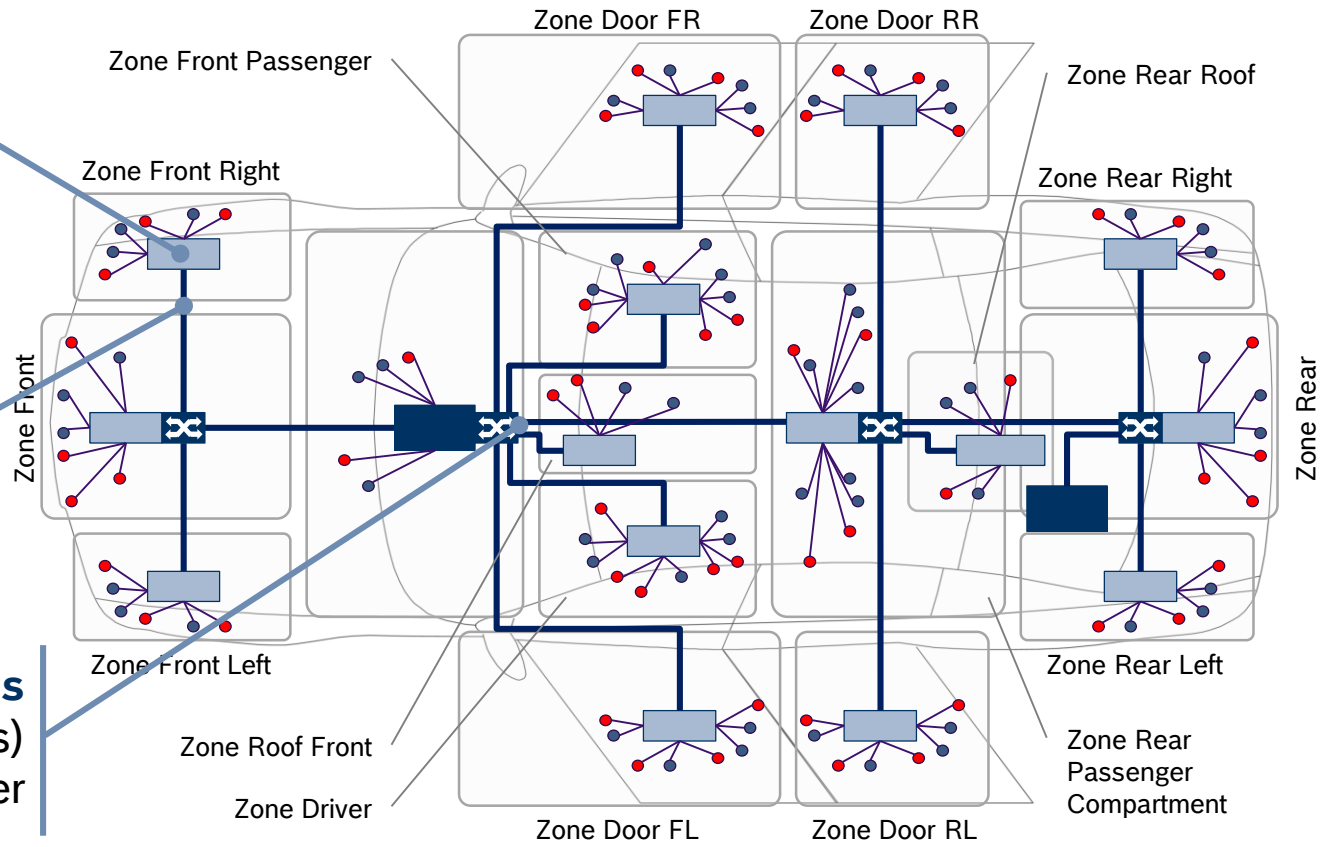


Vehicle centralized E/E architecture
Derived Concept

Cross domain **Zone ECUs** as zone specific I/O masters which act as an neural network for central ECUs

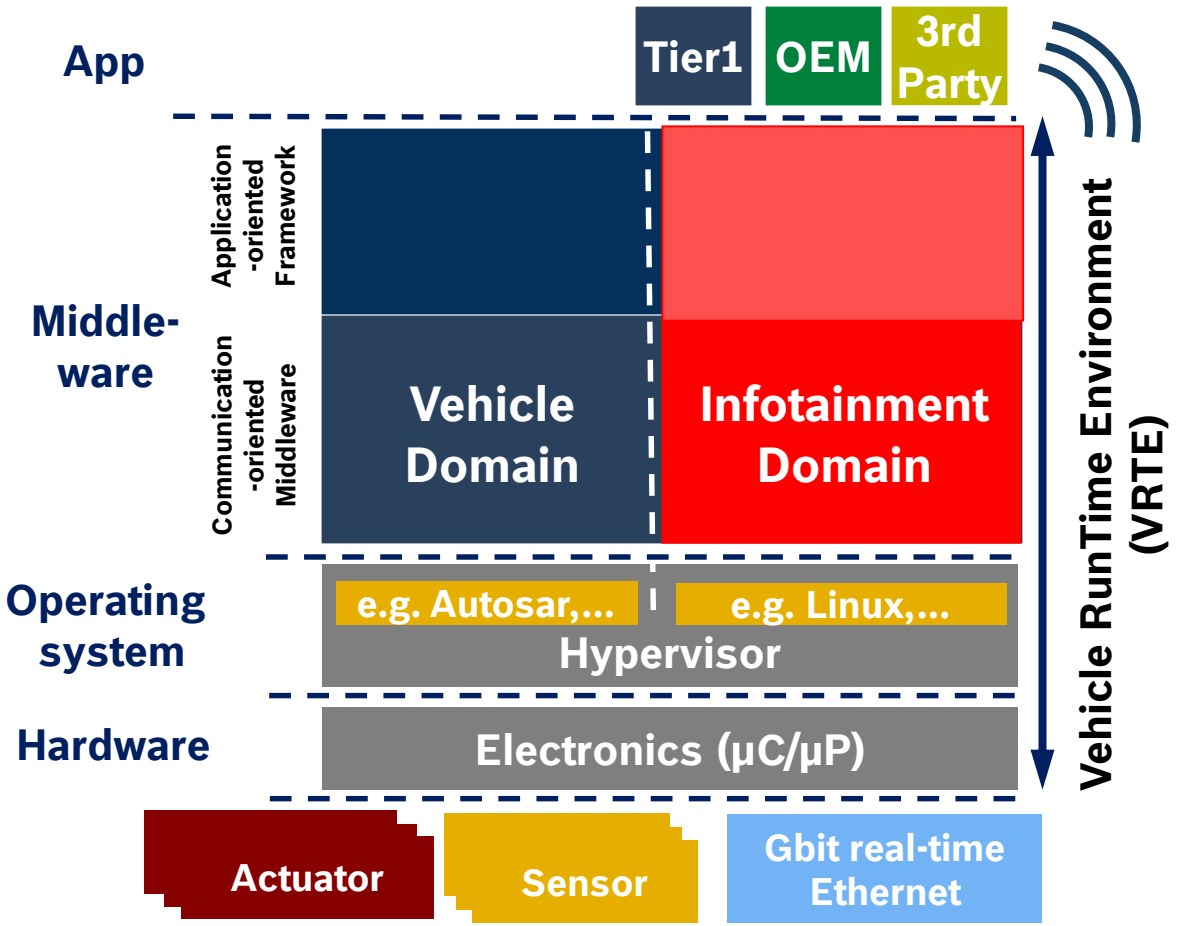
Cross Zone Communication
High bandwidth communication with Ethernet backbone

Vehicle Computer/Central ECUs
as central calculation units (brains) and information provider



Schematic representation of zone approach

Vehicle computer
Building blocks



high performance central vehicle computer

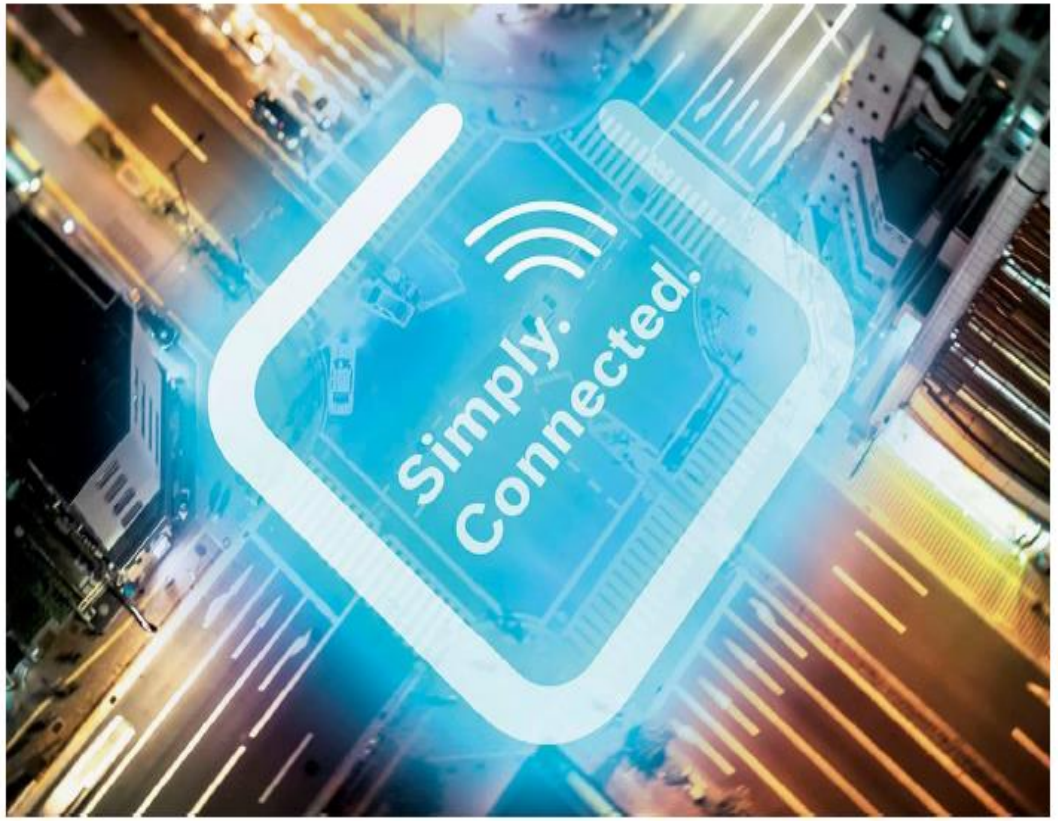
automotive runtime environment (safe/secure)

service oriented architecture (plug&play mechanism)

seamless integration in backend cloud architectures via FOTA/SOTA

high speed communication with Gbit real-time Ethernet

Future Mobility
Conclusion



Future Mobility will be **automated, connected, electrified** and **multimodal.**

Zero accident driving will be achieved through **Cross domain applications**.

Vehicle Computer will provide the resources, and will be launched **5 years earlier.**

Legal security for customers and companies needed as prerequisite for

Thank you

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