Changing Role of a TIER 1 in the Automotive Industry

Jean-François Tarabbia | September 22, 2022

We expect the Vehicle of the Future to be like a Smartphone on Wheels

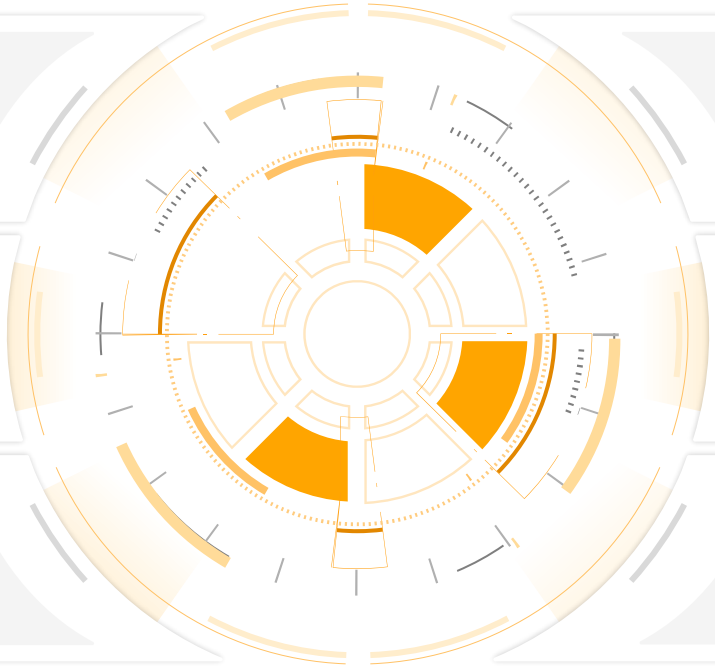
The “Revolution” of the Automotive Industry

Market Trends

Automated Driving

Shared Mobility

Alternative Drive



Software-Defined Cars

IoT

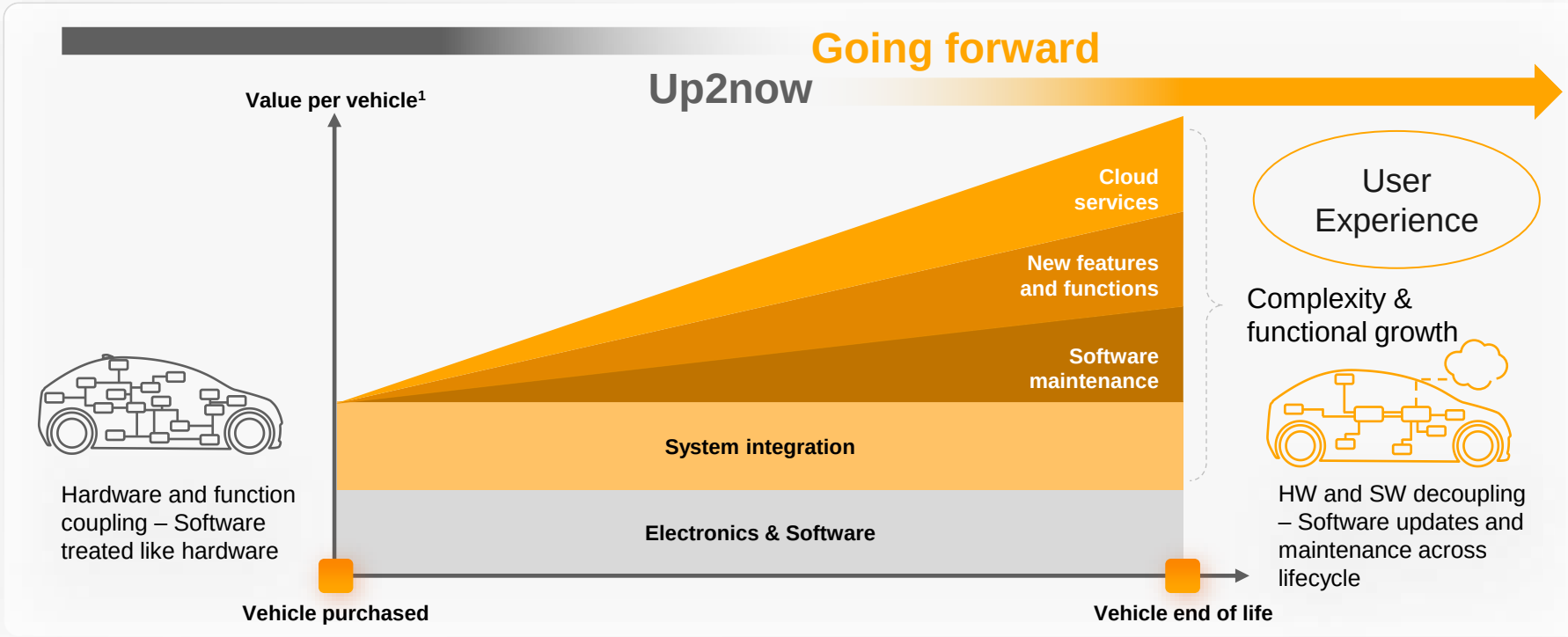
Cloud Services

*E/E = electrical/electronic, IoT = Internet of Things

Lead to a Breakthrough

The Software-Defined Vehicle

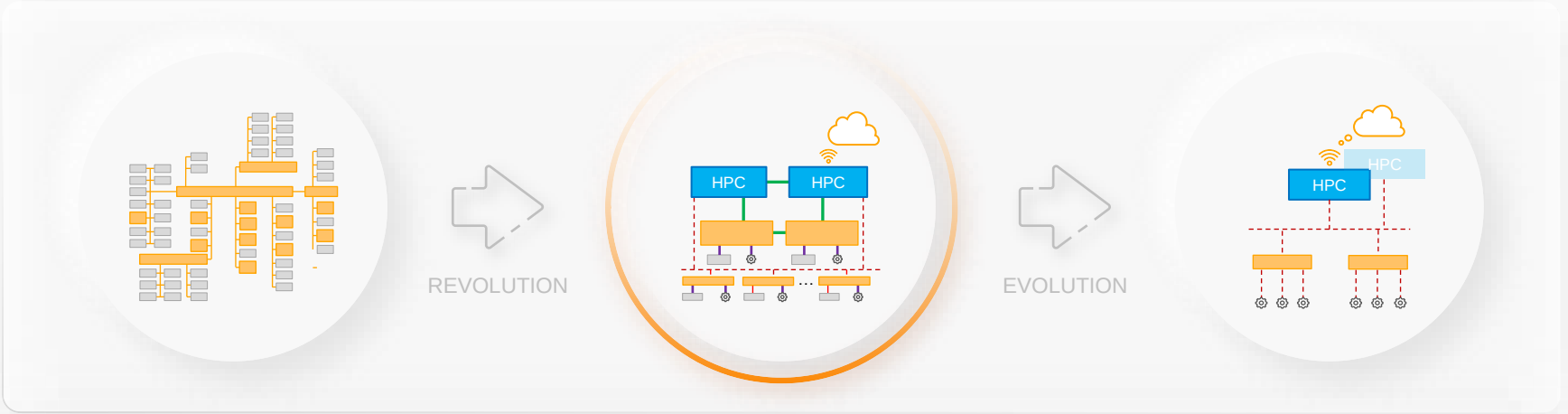
Numerous Opportunities and New Value Streams



[1] Not to scale; for illustrative purposes only

Automotive Industry Transformation

New Architecture with Introduction of HPCs



PAST	TODAY	FUTURE
Distributed	**HPCs / Domains**	**Central HPC**

*HPC: High-Performance Computer

The Way to Central HPC

Main Market Trend of Domain Migration

TODAY | **FUTURE**

Domain Centric | **Domain Migration**

Automated Driving[1]

Cockpit

Body

Safety & Motion

X-Domain Integration

AC AD[1] & Cockpit

VC(+) Vehicle Control + (AD)

VC Vehicle Control (Body + Safety & Motion)

Central HPC

[1] up to L2+

*HPC: High-Performance Computer

An Entirely new Dimension of Complexity

Industry Example

High-Performance Computer (“ICAS 1”[2]) for VW MEB Platform

Introduction of server-based architecture, one powerful HPC replaces several ECUs

Agile approach with continuous customer communication

68

Links to other ECUs[3]

> 30.000

Protocol messages in the vehicle

19

Companies working on the software for a single ECU

> 70,000

Stakeholder requirements

> 3.1 million

Working hours till 1st SOP at Continental to develop software

40

3rd party applications

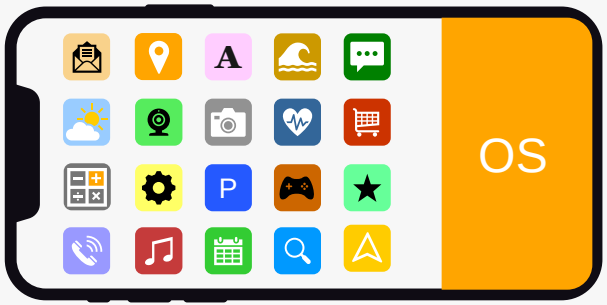
[1] HPC: High-Performance Computer [2] ICAS: InCar Application Server, [3] ECU: Electronic Control Unit

Dream or Reality?

The Software-Defined Vehicle

Facing Numerous Challenges

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



Faulty software is **annoying**

> 100 microcontrollers	> 10 displays	Hundreds of sensors
1,995 kg	Numerous OS	250 km/h[1]

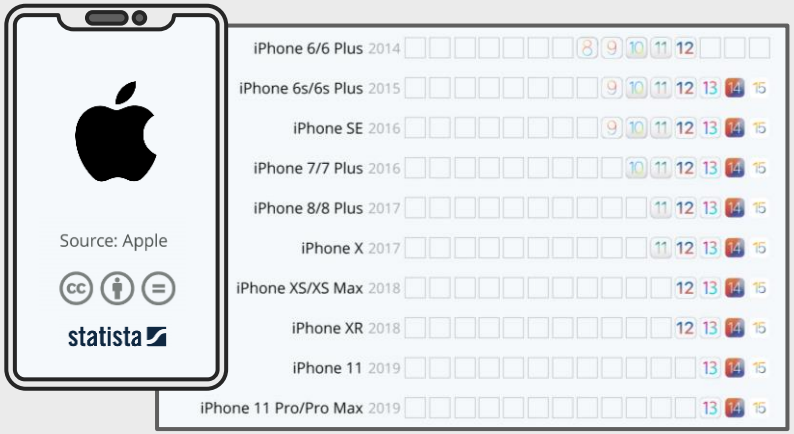
Faulty software **can be fatal**

[1] Reference vehicle: German premium class vehicle in 2020

Software Defined Vehicle

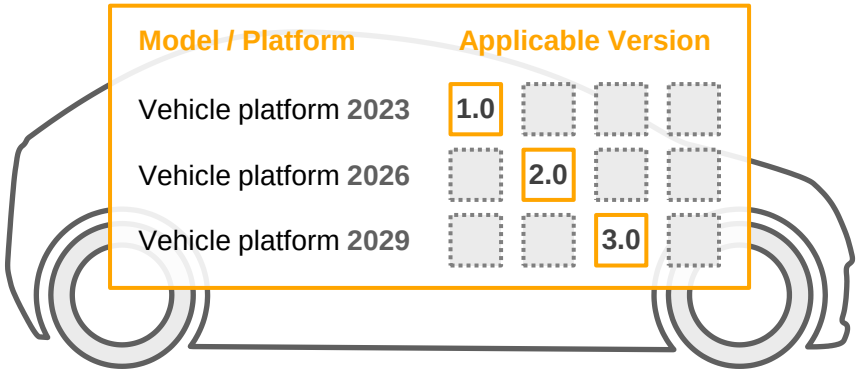
Enabling a Multi-Generation Software Lifecycle

How long does **Apple iOS support** iPhone models?



- Devices receive multiple platform upgrades
- New apps run on old platforms versions
- Devices maintained for several years

How is **Automotive software maintenance** performed?



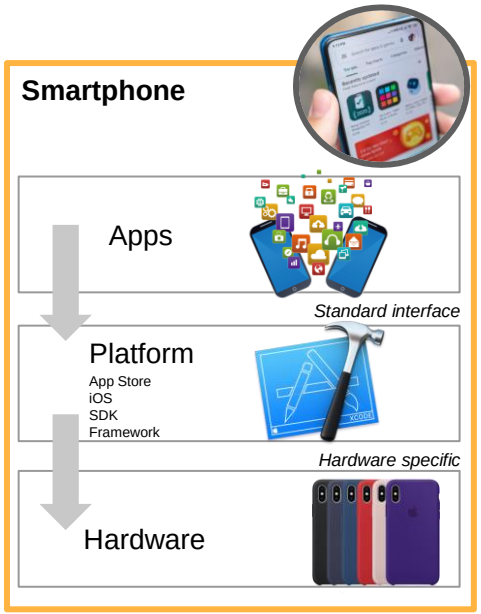
- No upgrades of SW platforms to older vehicle platforms
- No backwards compatibility of new functions to old SW platform versions
- No Over the Air Update for operating systems

Mastering Cooperation Challenges

Tools and Methods: Continental Cooperation Portal

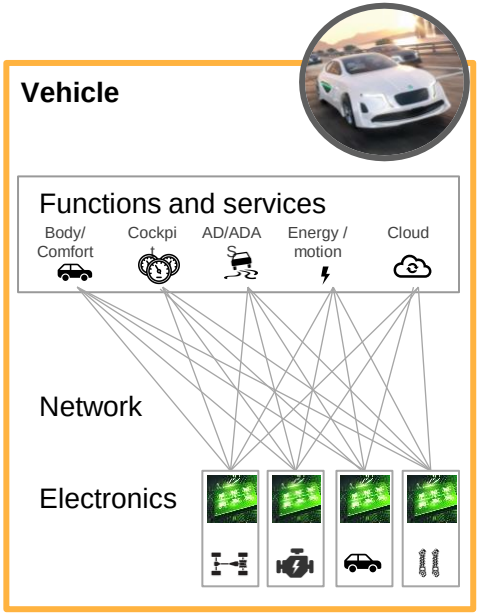
Smartphone vs. Vehicle and the Vehicle of the Future

Automotive OS

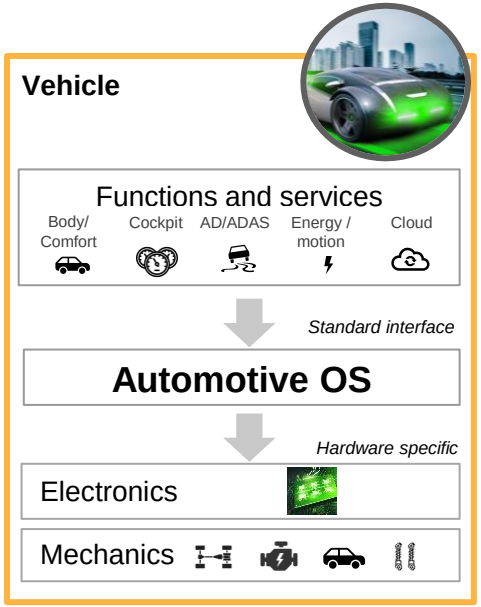


Example Smartphone
Software development decoupled from hardware development

vs.



Current Vehicle Software Architecture
Lack of „one language“ for communication between apps and hardware

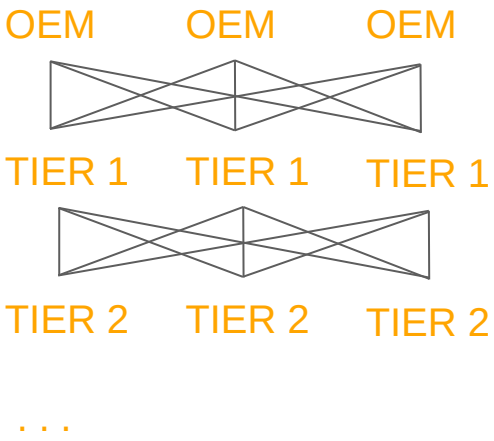


Future Vehicle Software Architecture
Development of functions decoupled from cycle of hardware development

Changing Profiles in the Automotive Industry

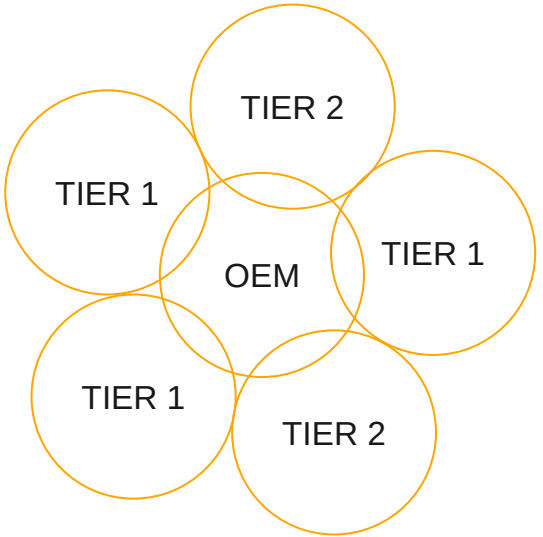
Roles?

Today´s Supply Chain

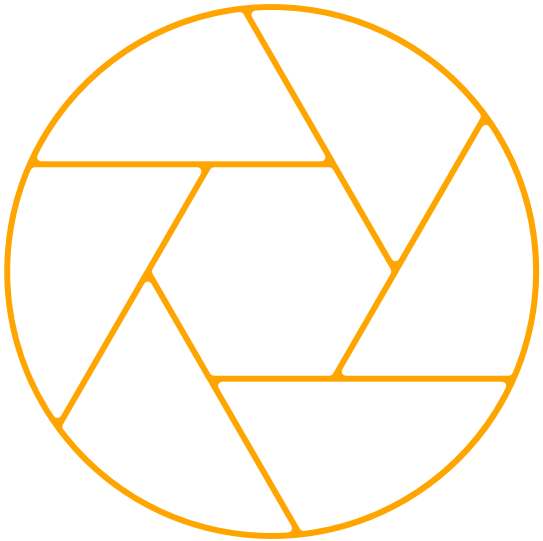


VS

Future Supply Chain



Focus on Software Engineering Key Challenges



- New Competences
- Know How Management

Summary

Summary

Ecosystem / Value Chain

Open APIs & SDKs

Collaboration Models

Toolchain / PMT

DevOps Culture

Fast Cycles

› **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

Thank you very much for your attention!