



Shaping a new era of mobility

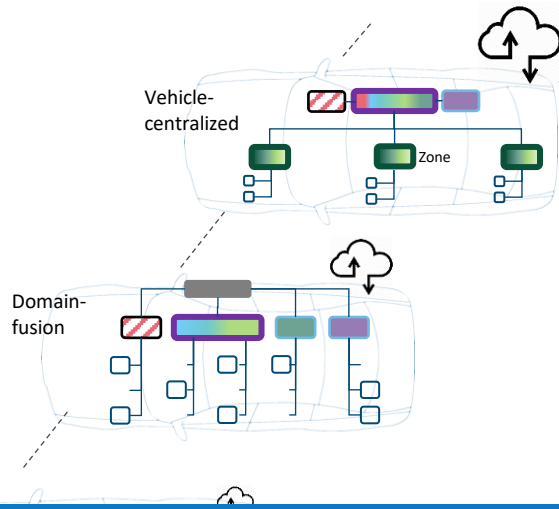
Software Defined Vehicle

Vadiraj Krishnamurthy

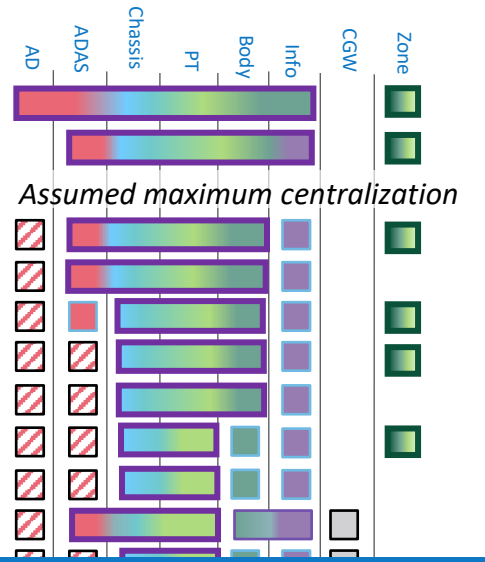
CTO, Bosch Global Software Technologies

E/E Architecture Trend: Increased Centralization

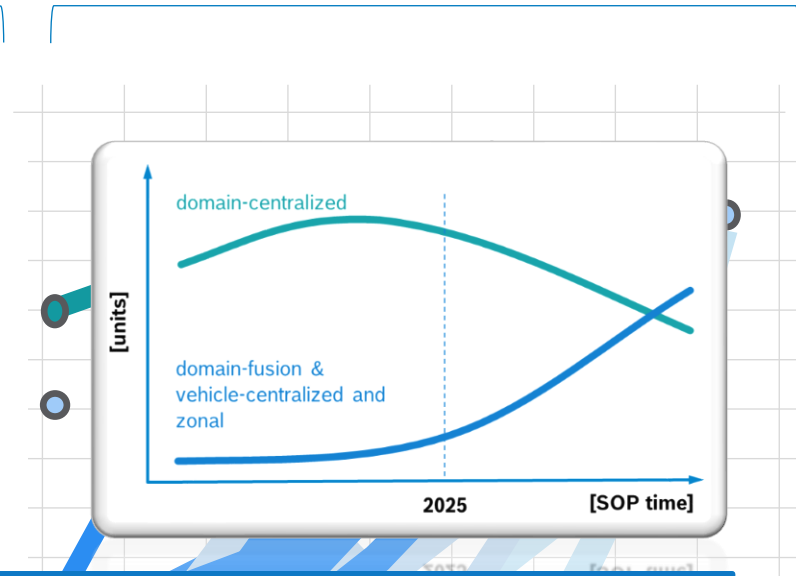
E/E Evolution (E/E classics)



E/E Patterns



OEM Evolution / Revolution hikes

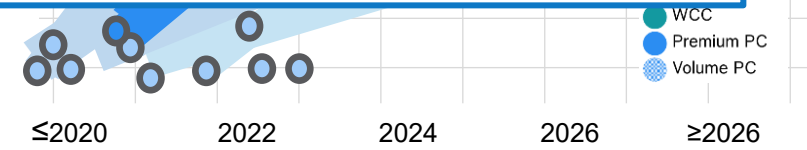


Complexity of E/E architecture, due to increased number of functions according to PACE trend
 -> **“Vehicle Computer” (Centralization) and “Software Defined” is Key!**

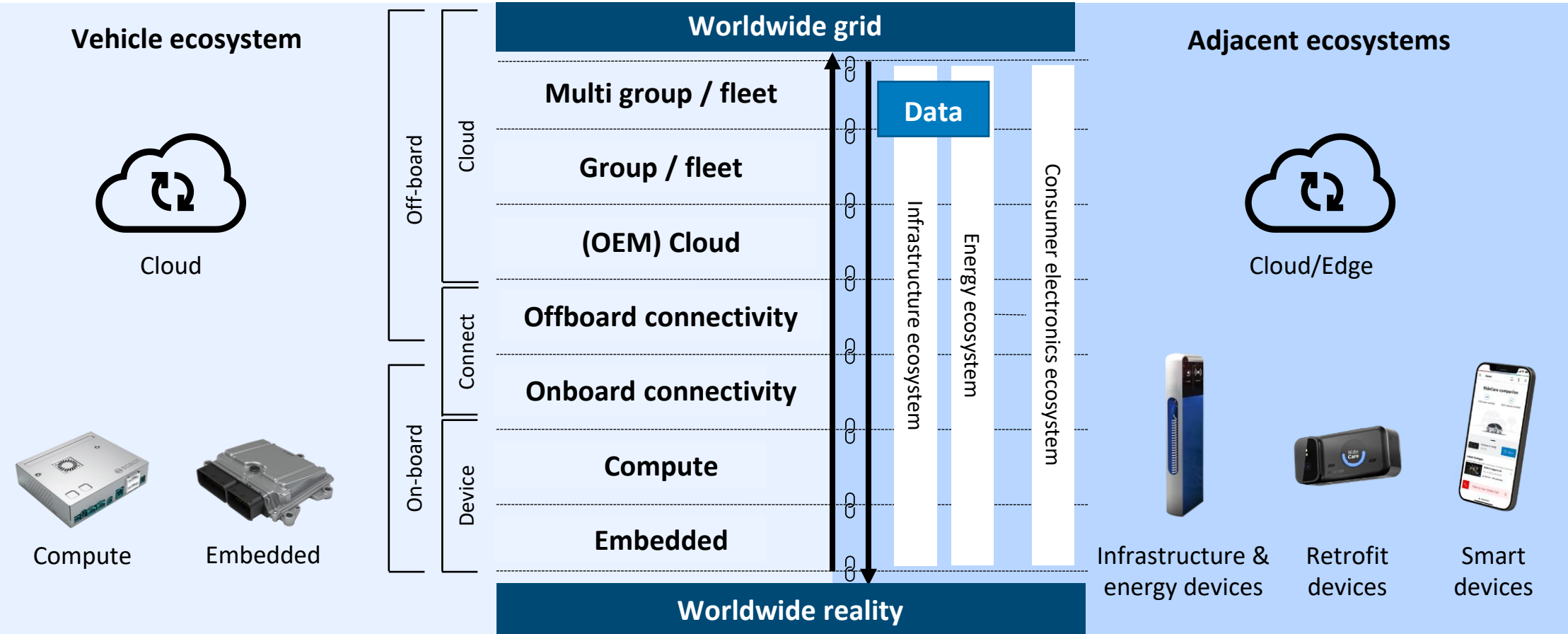
Domain centralization

- domain color code
- powertrain
- chassis
- body
- DA, AD-optional
- information
- µP

Selection via E/E-optimization Criteria

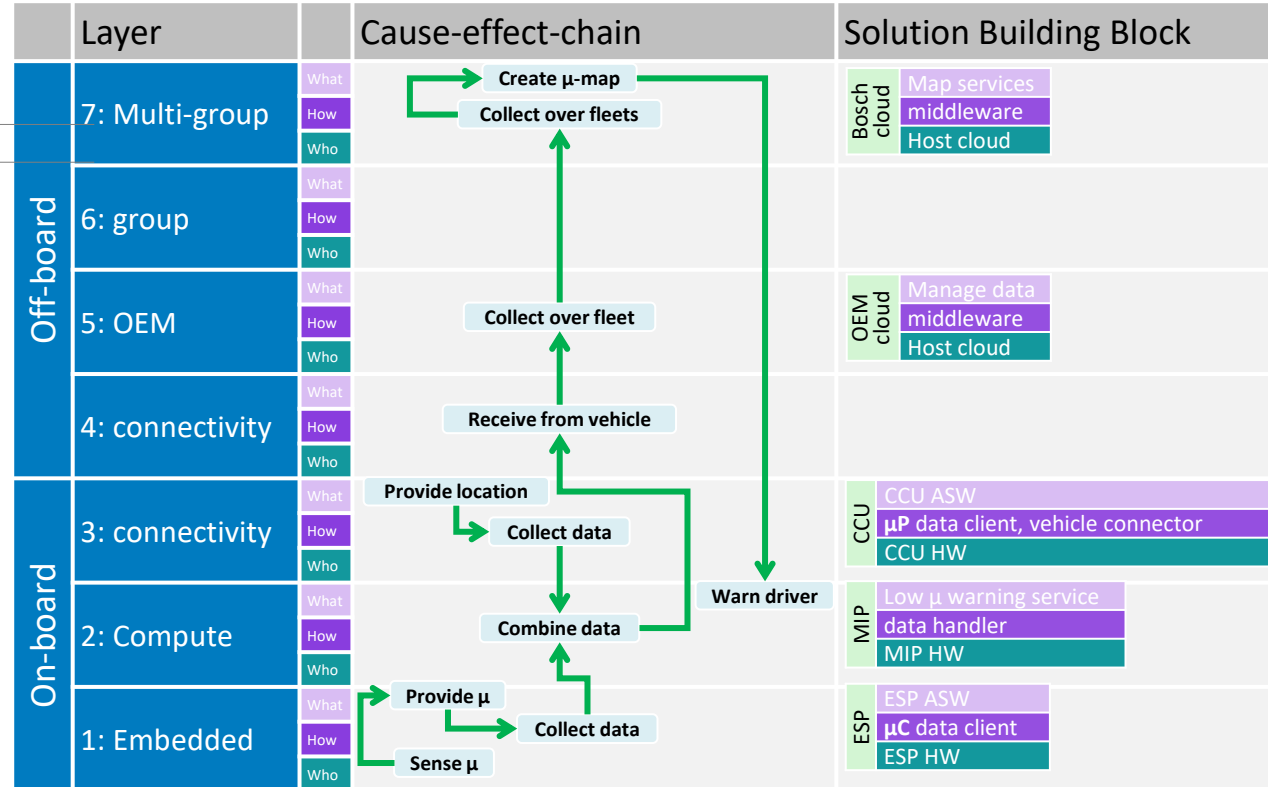
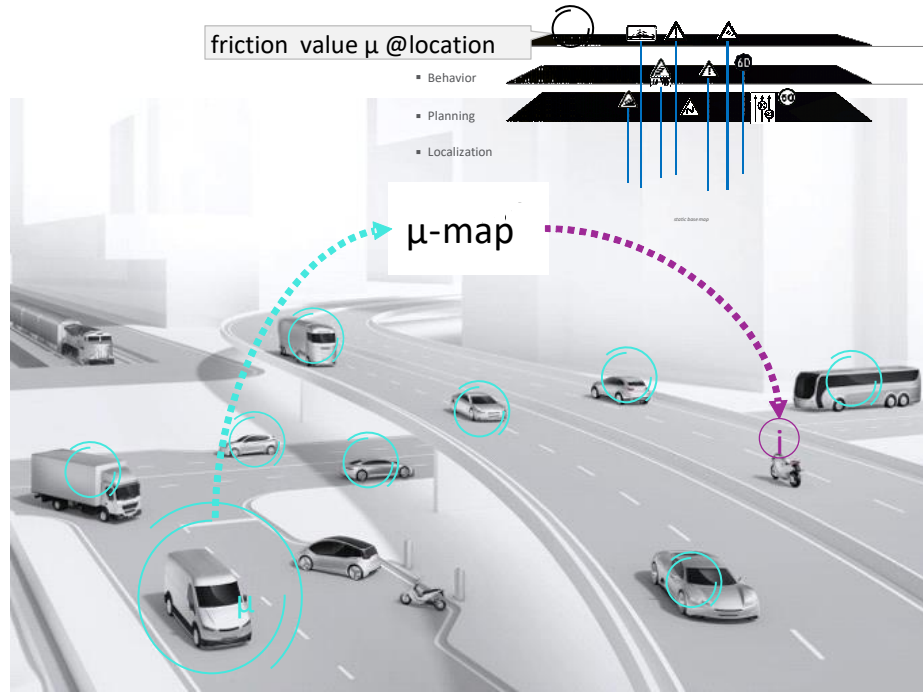


A Holistic System Architecture in Mobility Ecosystem



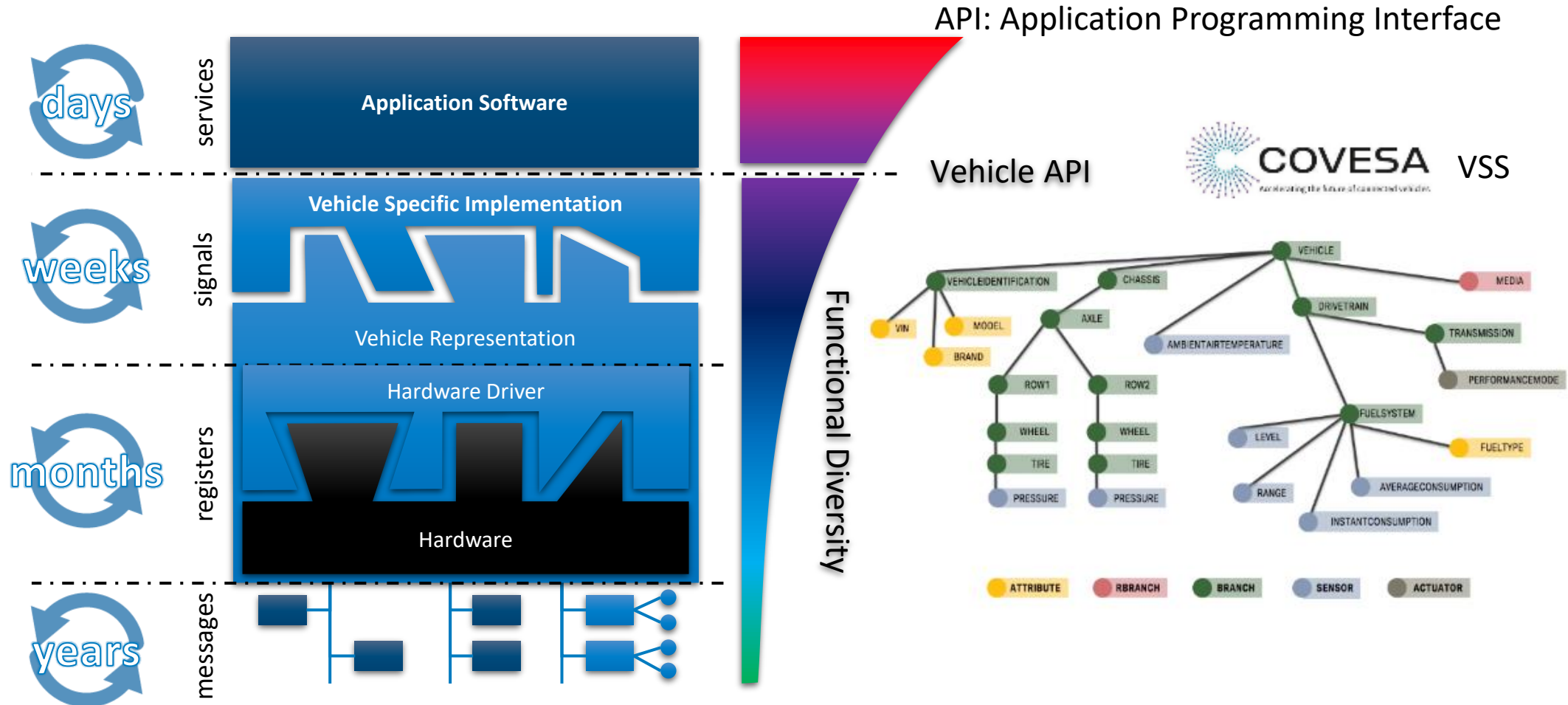
Example Friction Map

- Example: Warn driver of “low friction”



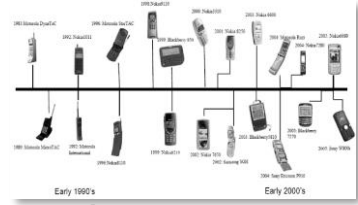
- A seamlessly and interoperable transport of data is key for a convenient user experience for the whole community of drivers

Vehicle API Fosters Decoupling of Software from Hardware/OS



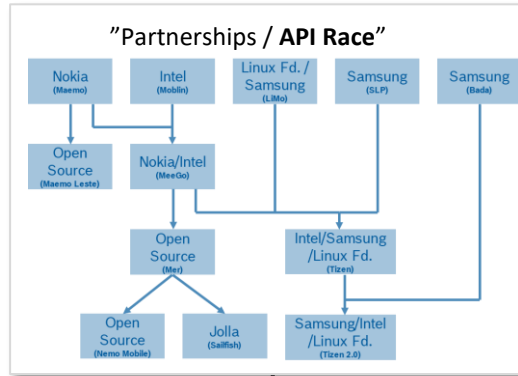
Mobile API Race

Feature Phones



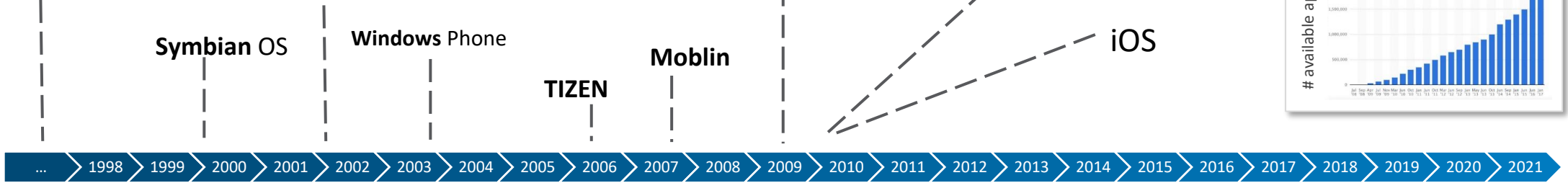
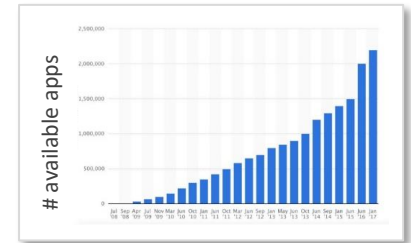
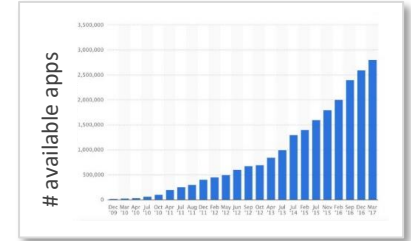
http://www.ef.org.vt.edu/archives/951

Java MIDP
(Standard API Set)



Android

iOS



Category	Fragmentation / Distribution / Separation (Pre-2008)	Fragmentation / Distribution / Separation (Post-2008)
OS	high fragmentation	little fragmentation
distribution	operator portals	application stores
separation	HW, MW, SW App mostly bundled	HW, MW, SW App separated

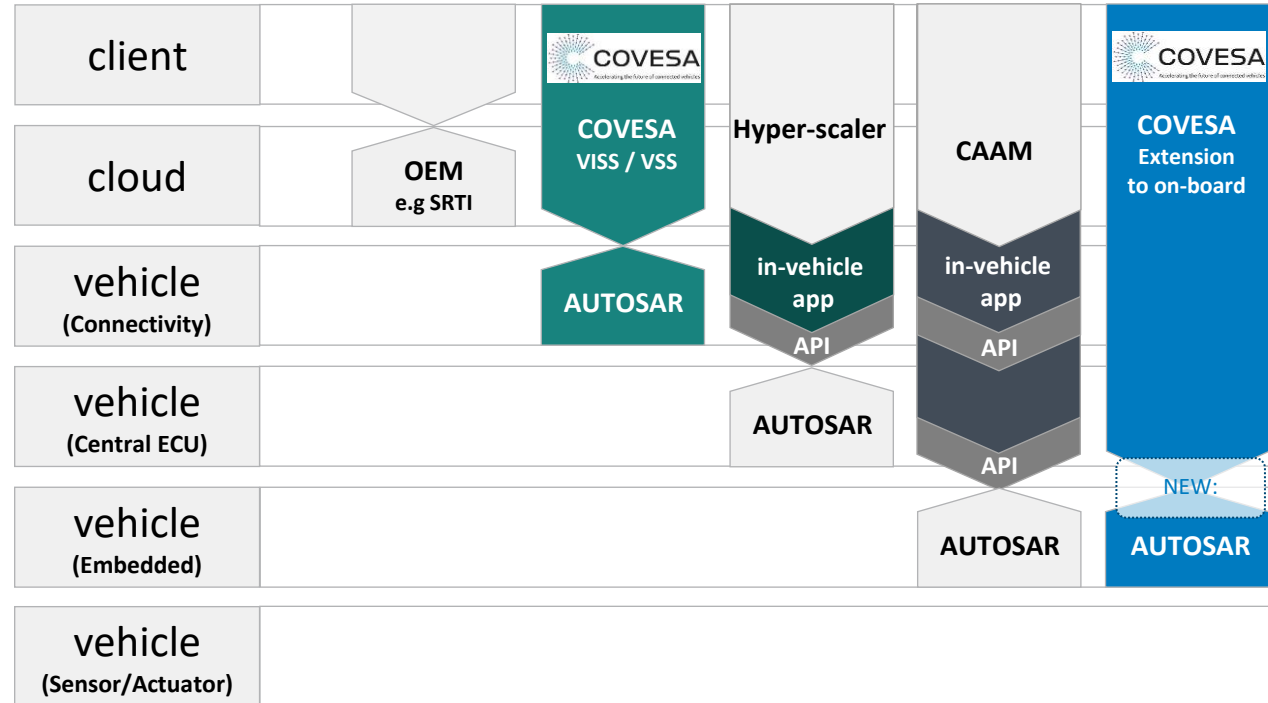
Mobile API was won by hyperscaler (other companies disappeared)

Open International API with COVESA+AUTOSAR

- Current available open interfaces for in-vehicle apps, including semantics and syntax:

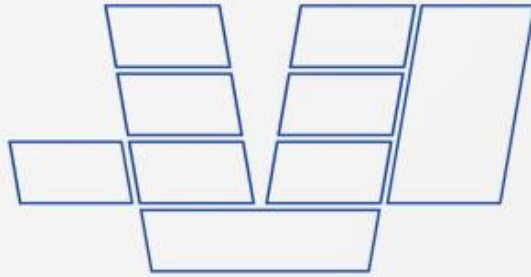
- [COVESA VSS and W3C VISS](#) (also used by Amazon AWS)
- [Android Automotive vHAL](#)
- CAAM SDV-initiative [Part 1](#) and [Part 2](#) (lead by Huawei)

COVESA: The Connected Vehicle Systems Alliance
 CAAM: China Association of Automotive Manufacturers

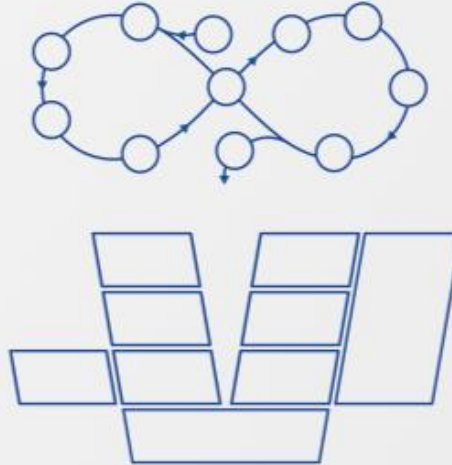


Market trend towards an in-vehicle API.
 Hyperscalers push into the vehicle by setting their (proprietary) API.

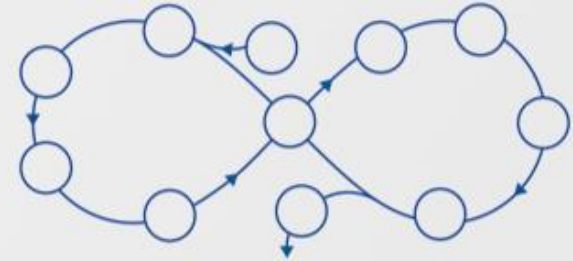
One Operational Model



Deeply embedded software development (ASIL)
Example: airbag controller



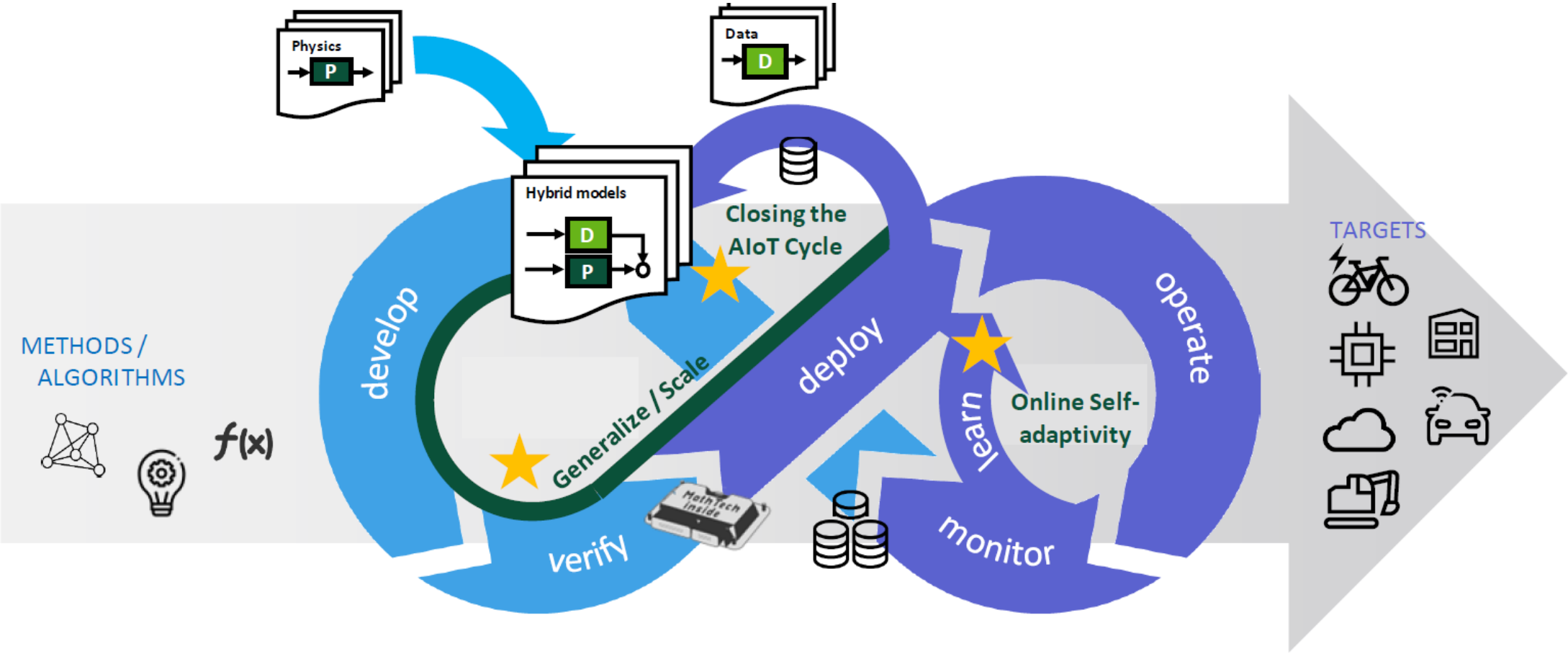
Automated driving (ASIL)
Example: highway pilot



Edge runtime (QM)
Example: light show

Different software development paths integrated into one holistic operational model

Virtualized Cross Domain Development and Testing



Boost intelligence to create Self-Adaptive AIoT Products

A person wearing a white long-sleeved shirt is shown from the side, holding a black smartphone in their right hand. They are standing in a parking garage. In the background, a car is blurred with vibrant, multi-colored light trails (red, orange, yellow, pink) emanating from it, suggesting motion or a futuristic theme. The floor has yellow parking lines.

Thank you!