



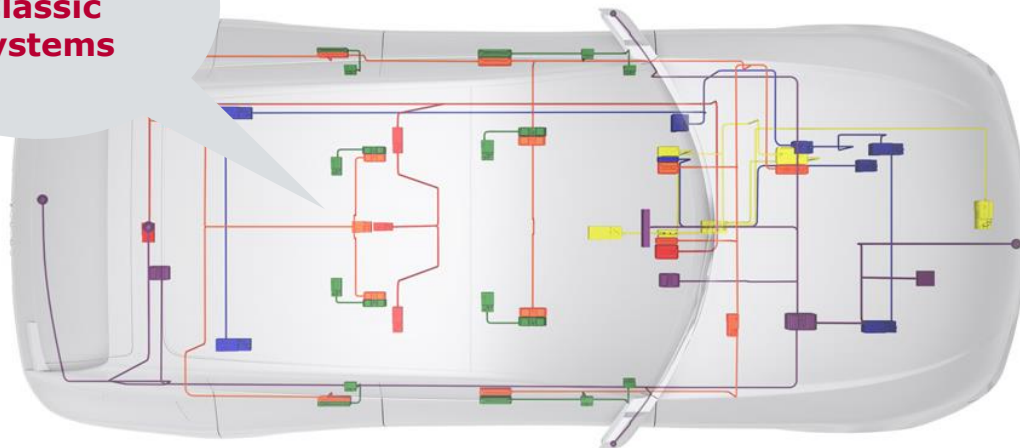
Architectures of High Performance Computing

9th Vector Congress 2018

Evolution of Vehicle Architecture

Connected ECU Architecture

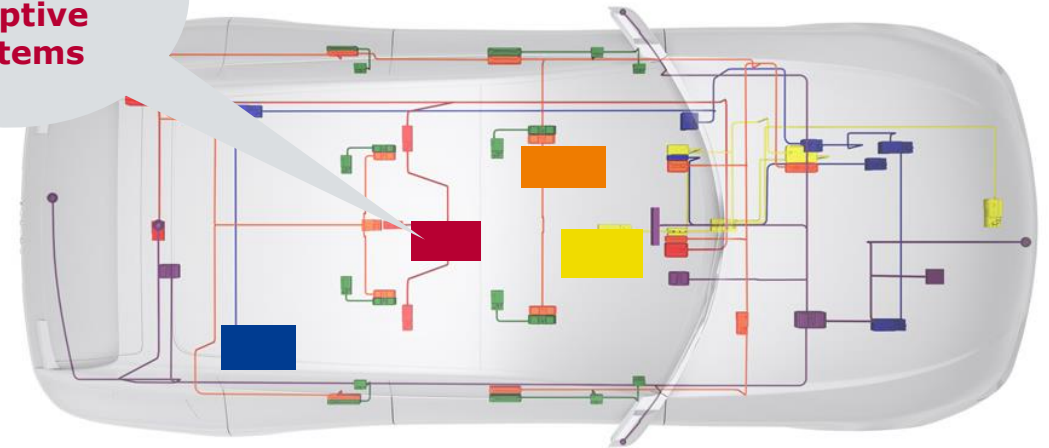
**AUTOSAR
Classic
Systems**



- ▶ ECUs implement dedicated function
- ▶ One supplier per ECU
- ▶ Limited amount of data shared between ECUs

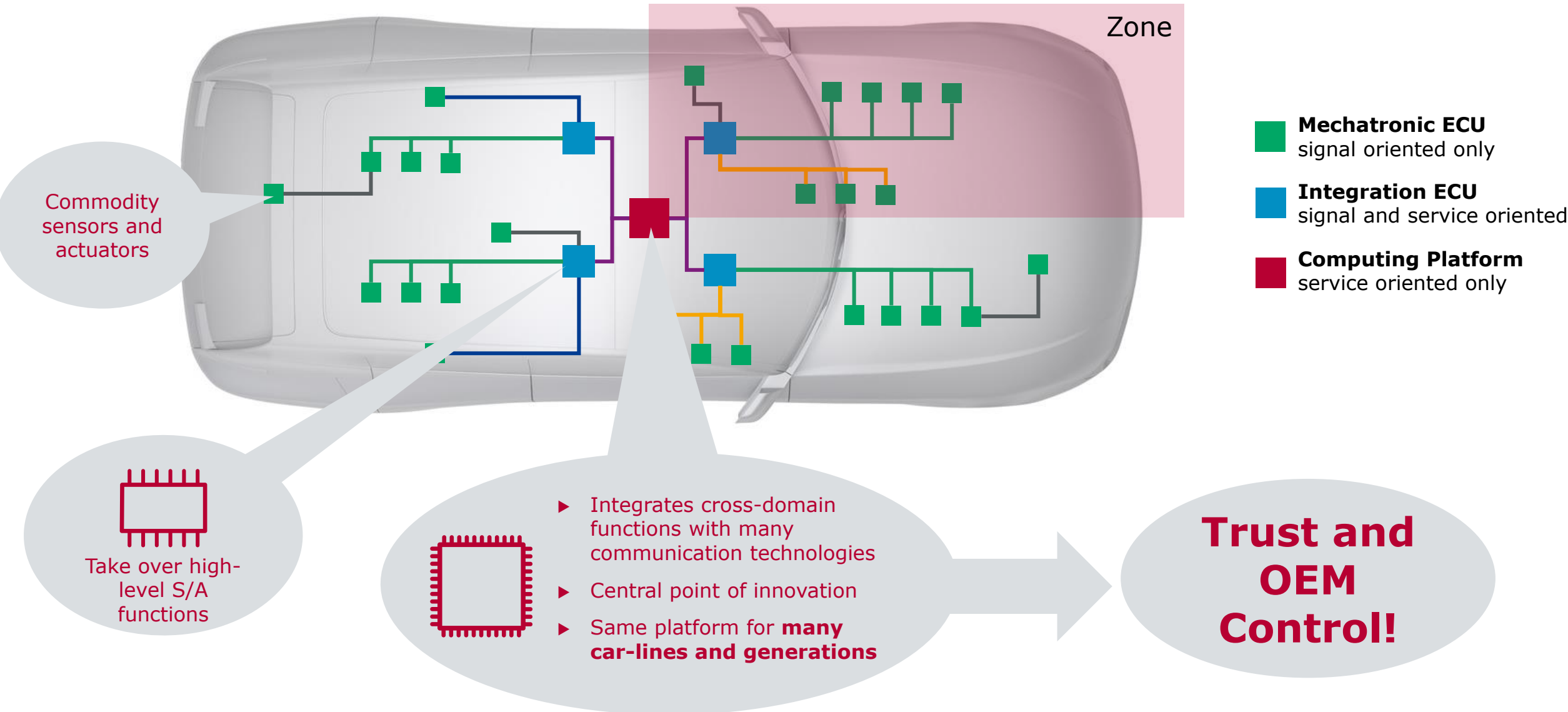
Domain Controller Architecture

**Stand alone
AUTOSAR
Adaptive
Systems**

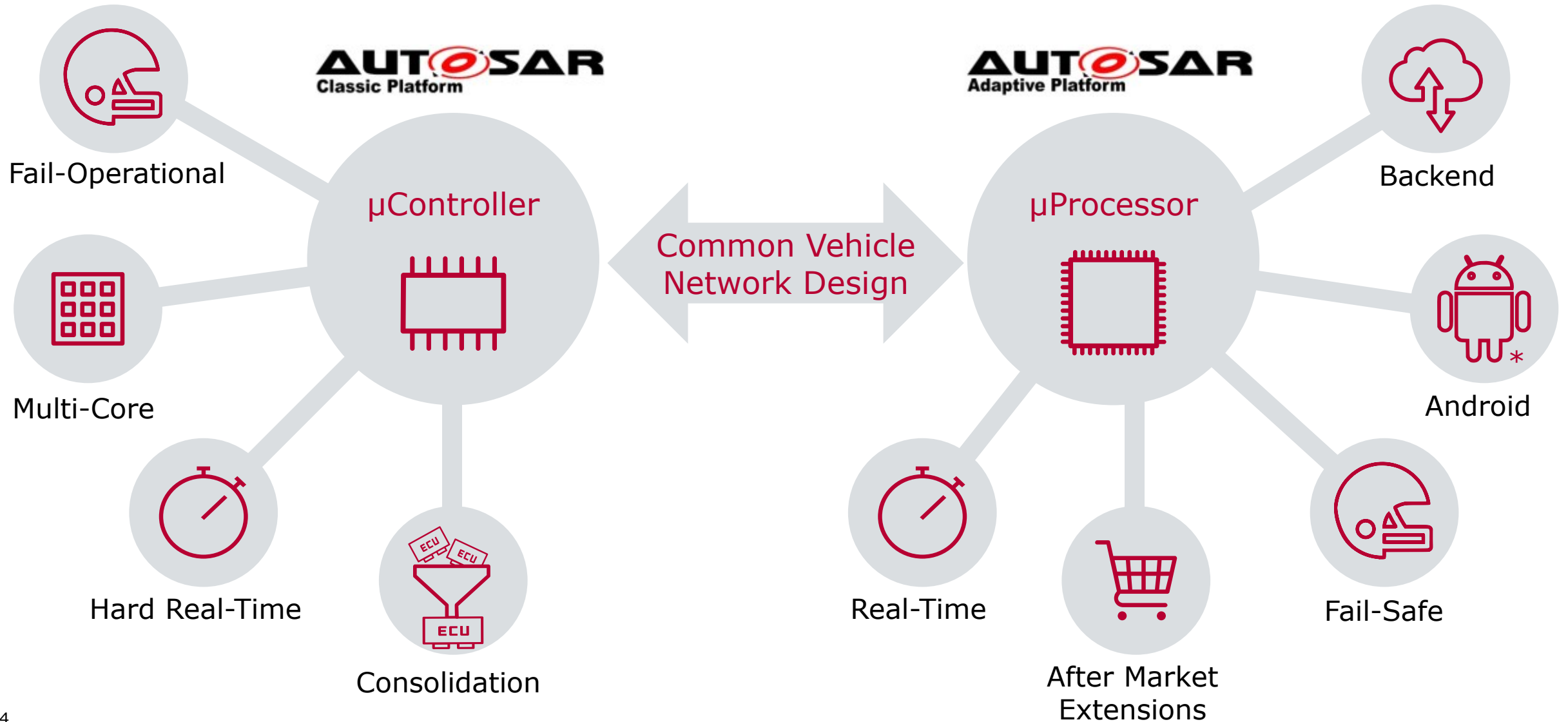


- ▶ Functions integrated per domain
- ▶ Multiple application software supplier per ECU
- ▶ High-level functionality of sensors and actuators already reduced and moved to Domain Controllers

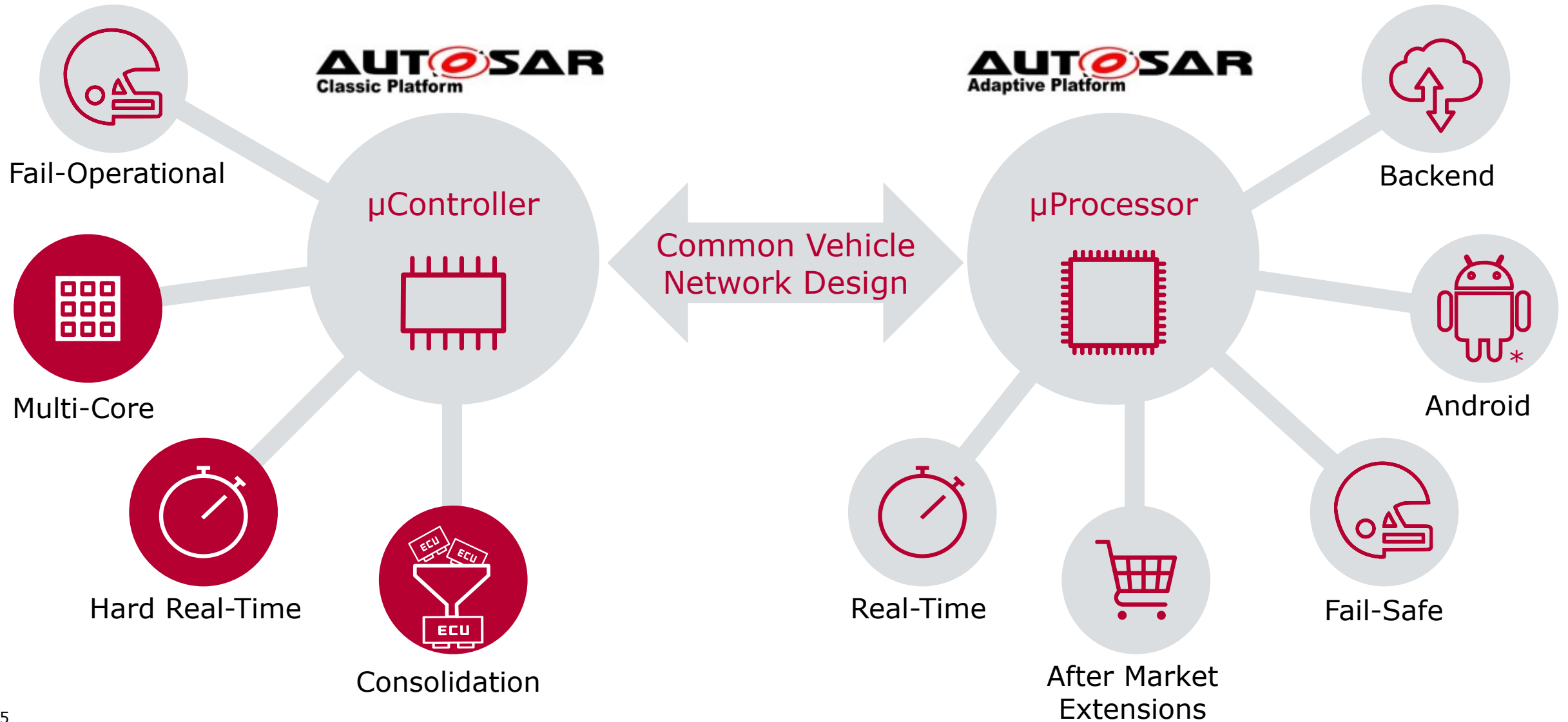
Central Computing Platform (Zonal Architecture)



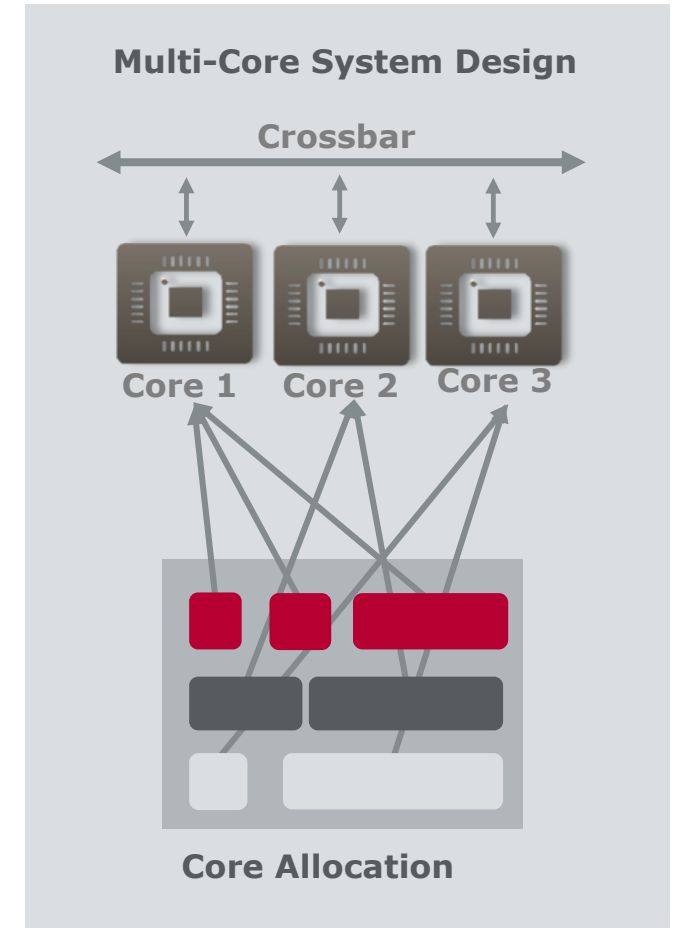
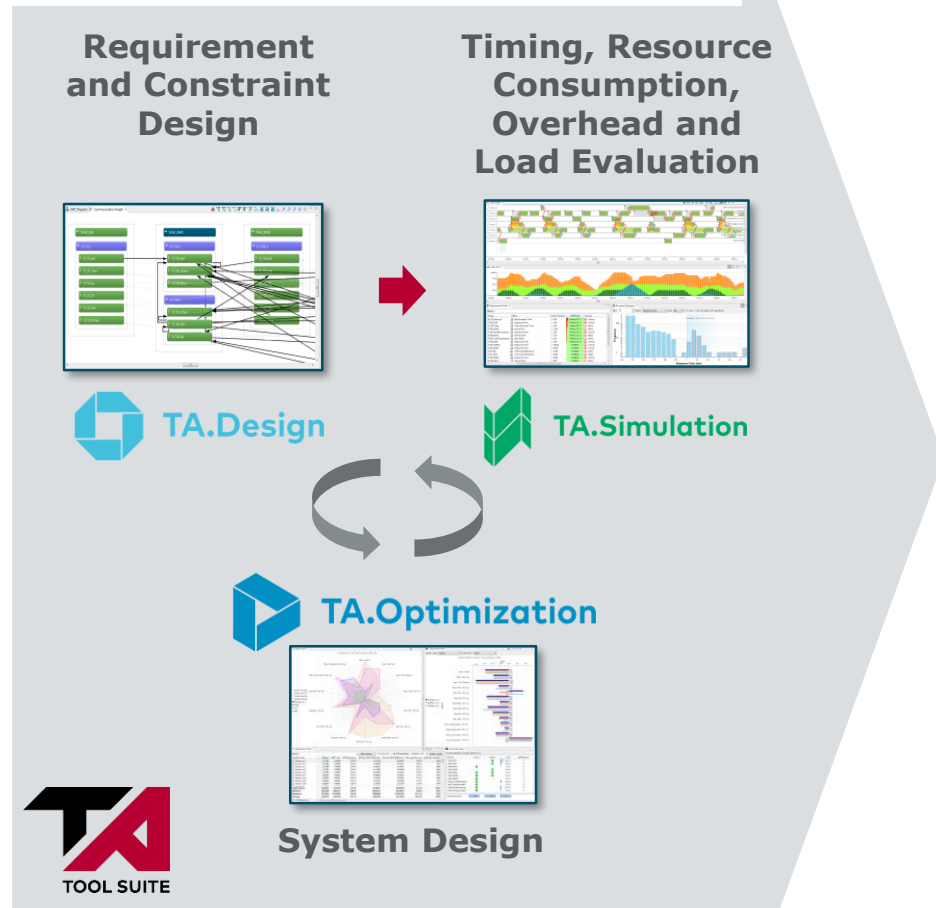
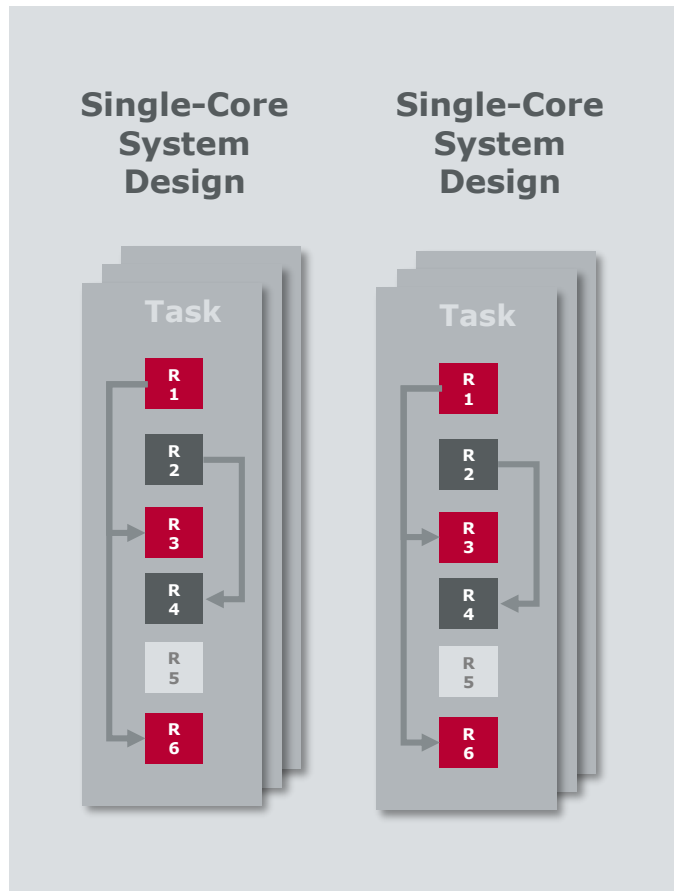
Challenges for High-Performance Controllers



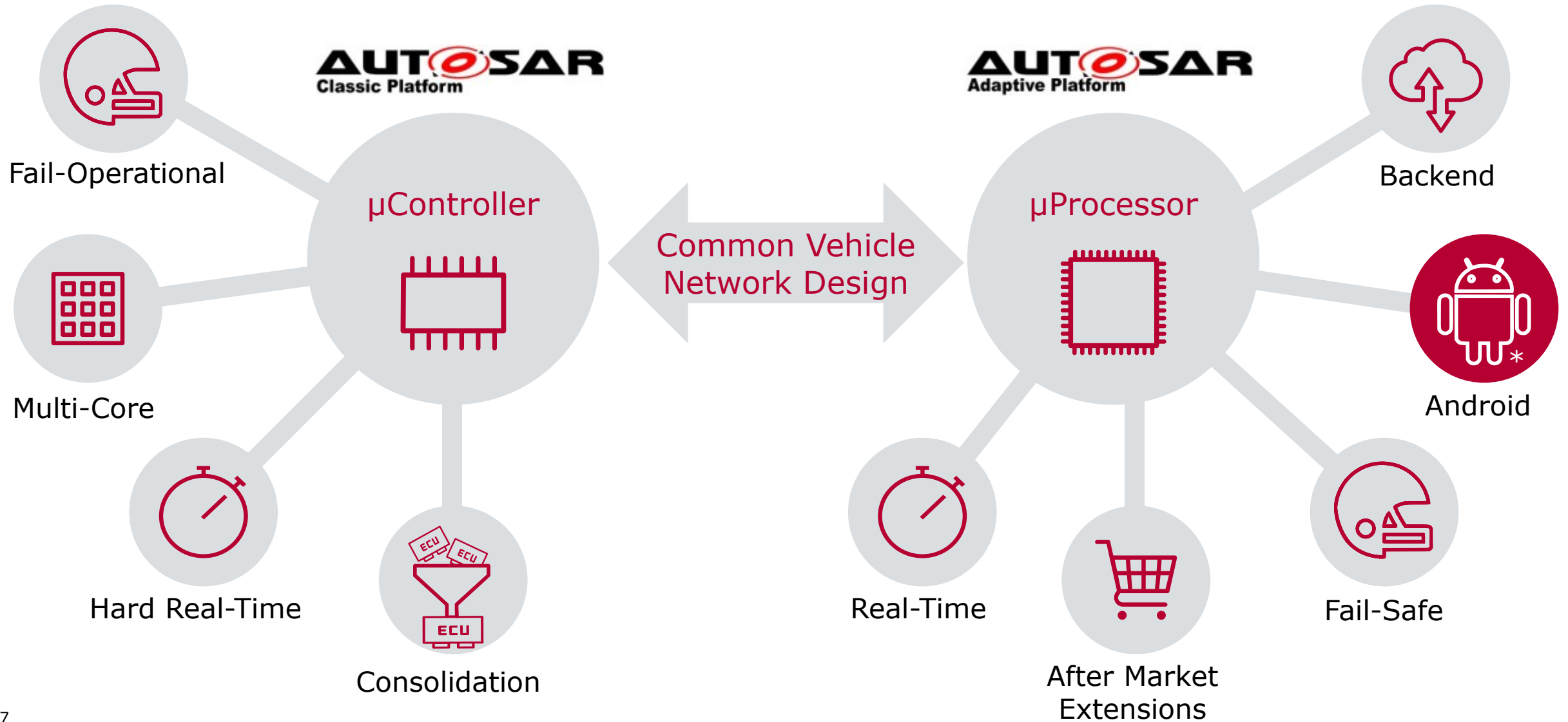
Challenges for High-Performance Controllers



High-Performance with Multi-Core Systems



Challenges for High-Performance Controllers



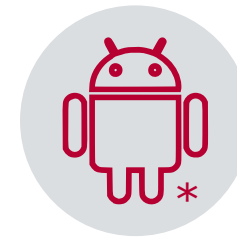
Integration of AUTOSAR Adaptive with Other OS Options

Benefits of AUTOSAR Adaptive

- ▶ Focus on established formats and workflows
- ▶ Supported by existing tools (PREEvision, CANoe, CANape, CANdelaStudio)
- ▶ Connected with AUTOSAR Classic ECUs
- ▶ Easily connected with cloud/backend: DDS, REST, ROS
- ▶ Managed by the automotive industry and OEMs
- ▶ Possibility to integrate project specific features
- ▶ Integrates signal and service world
- ▶ Automotive specifics (diagnostics, SOMEIP, timesync,...) directly in POSIX applications

Benefits of other OS options

- ▶ Connectivity to smartphones
- ▶ GUI frameworks
- ▶ Custom access to vehicle network
- ▶ Well known by developers in infotainment domain
- ▶ Huge App-Store / software community
- ▶ Large set of libraries (augmented reality, machine learning, GPU usage, etc.)



Solution: use both!

Next: Hypervisor and Safe ECU architectures

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