

# Electrical & electronic architecture

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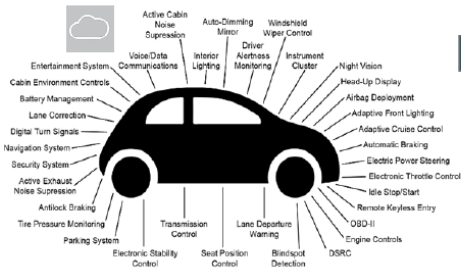
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# EAA evolution and trends

- Goal: Reduce development time and cost; open for software defined vehicles;

## Yesterday

Mechanical & ECU based

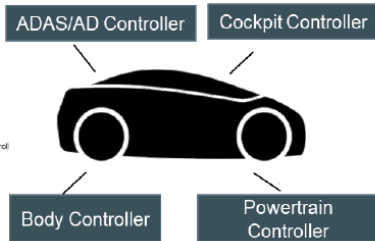


**Modular**

30 - 100+  
ECUs in a car

## Today

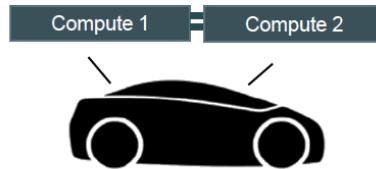
ECU & SW based



**Domain ECUs**

Consolidation of ECUs into domain controllers  
Reduces cost, weight and power consumption  
Leverages silicon and software innovations

## Tomorrow

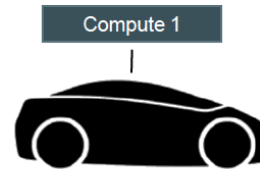


**Redundant Computing Platform**

Service-Oriented Architecture (SOA) direct memory access  
Parallel computing carrier offer redundancy and safety  
Open scalable platform for OEM system integration

## Future

SW defined



**Central Computing Platform**

Service-Oriented Architecture (SOA) network access oriented  
Dynamic configuration and seamless redundancy  
Blade upgradeable concept



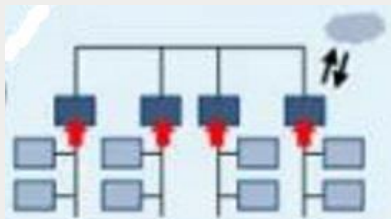
# MIH Platform evolution roadmap

## Domain Controllers

L2+ ADAS

EV Service Layer

HAL



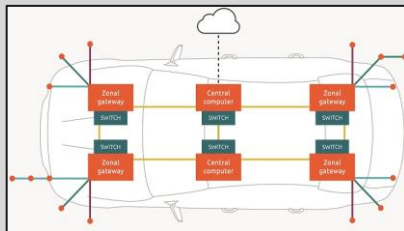
- Similar to current OEM offers
- Provides low-cost entry point

## Zonal / Centralized EEA

L2+ ADAS / L4 AD

EV Service Layer

HAL



- Proposal by Tesla, Vw

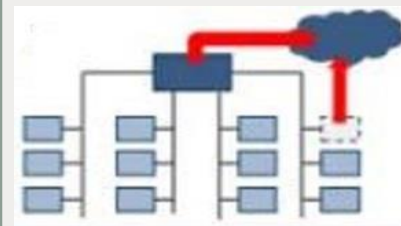
- Increased computing power for L4 and many other applications

## HPC / Cluster EEA

L4 AD

EV Service Layer

HAL



- Increased redundancy and efficiency



# System architecture reference design

Application

VCU

BCM

CGW

TJP

AVP

Middleware

Application Runtime

System Service and SDK

Communication  
Middleware

Safety  
Runtime

FuSa DDS

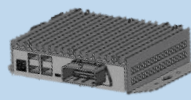
TSN/IPC/HSM

RTOS

CP/RTOS

RT-Linux/QNX

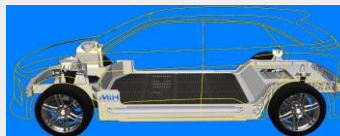
MCU



MPU

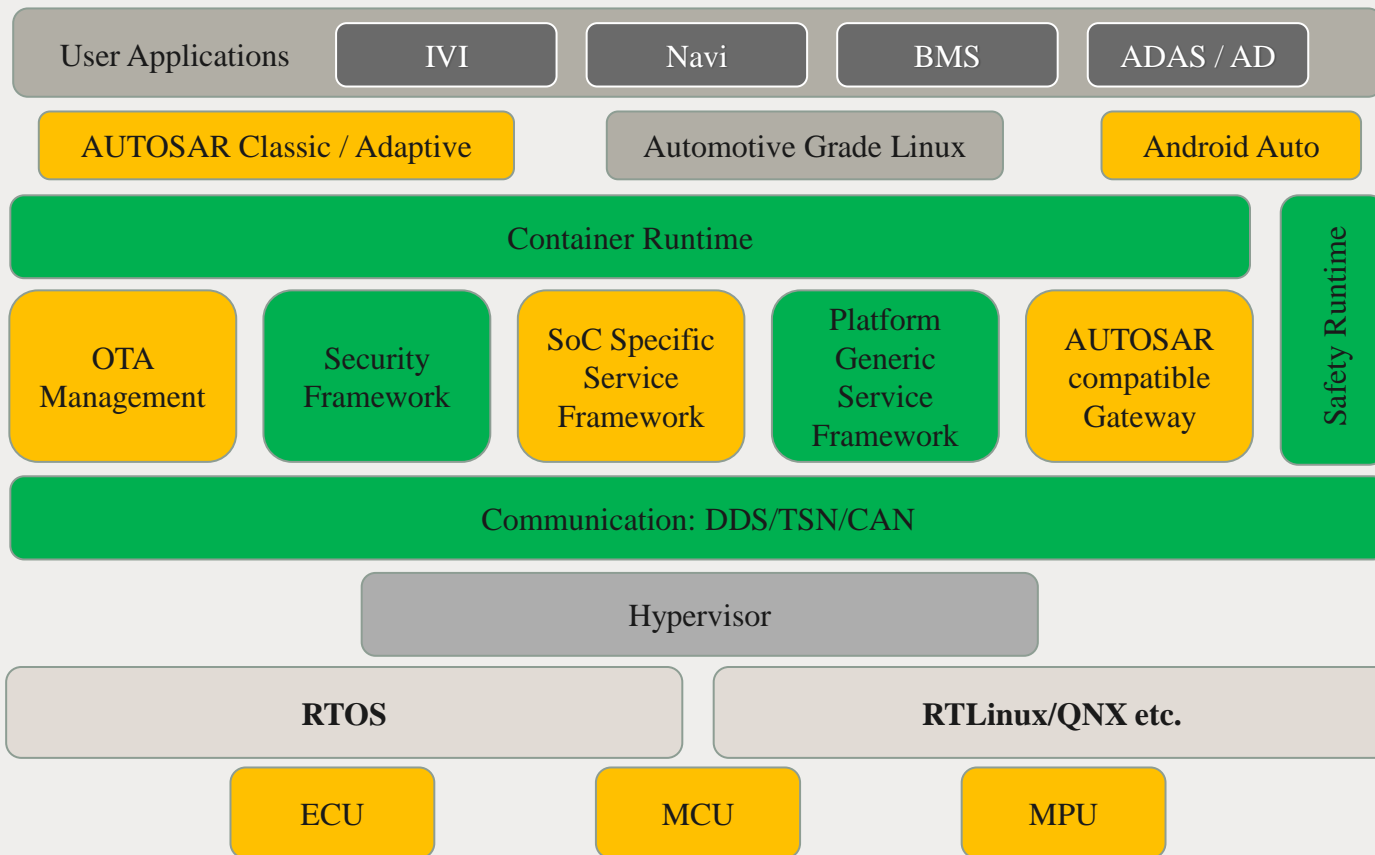
Sensors/Actuators

DBW EVKit





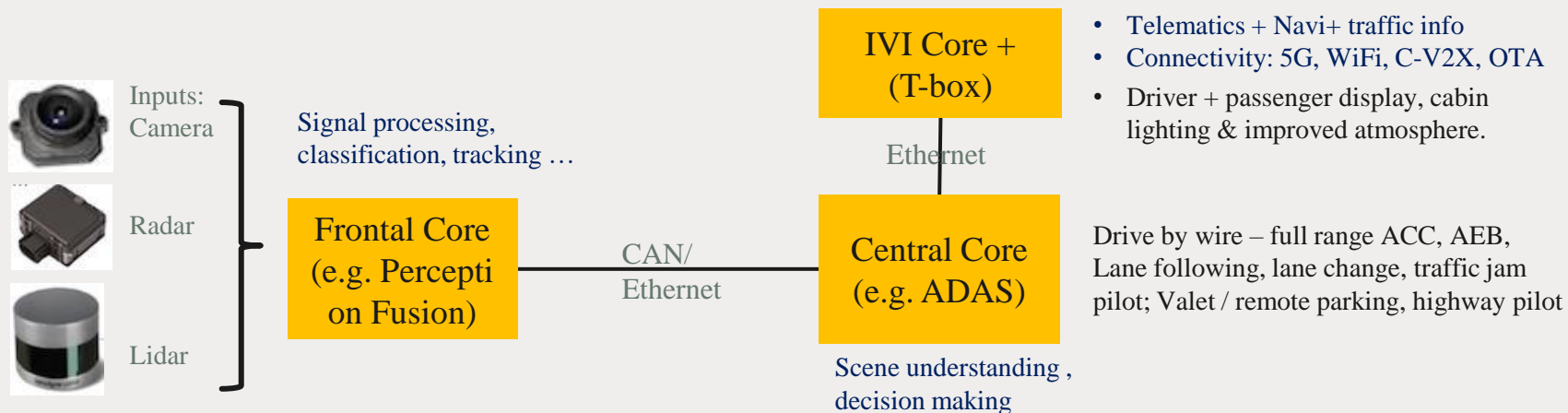
# Software architecture reference design



# Zonal / Centralized reference design

## Highlights:

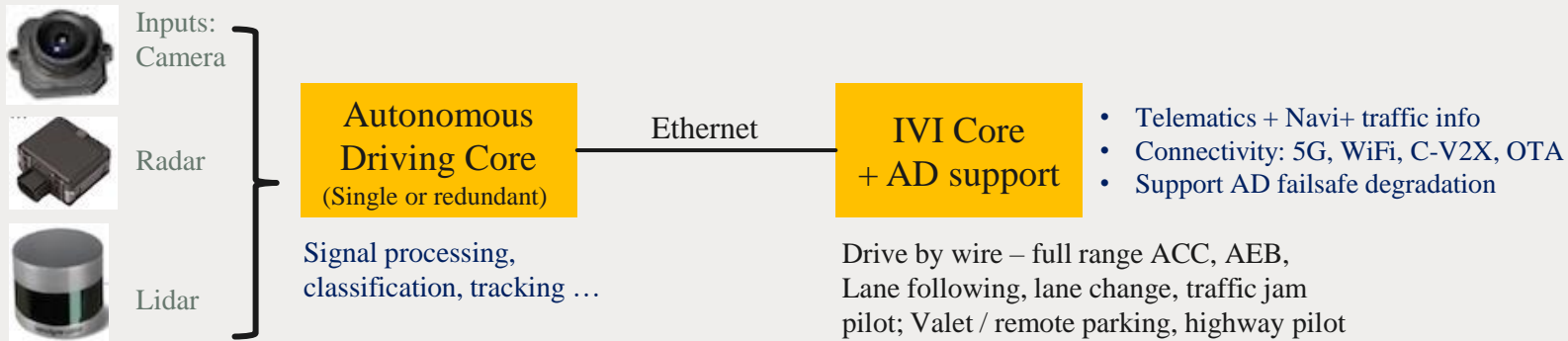
- Reduced wiring weight and cost: domain independent feature allocation (location based)
- Flexibility to cope with L2+ or L4 autonomous driving features
- Open to more sensor and actuator suppliers – cost optimization.



# HPC / MPU cluster reference design

## Highlights:

- Highly extensible for L4 and L5 autonomous driving applications.
- Sufficient computation headroom for future development.
- Open to more sensor and actuator suppliers – cost optimization.





# Conclusion

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- Reduce development time and cost.
- New features can be effortlessly deployed.
- Path towards software defined vehicles.