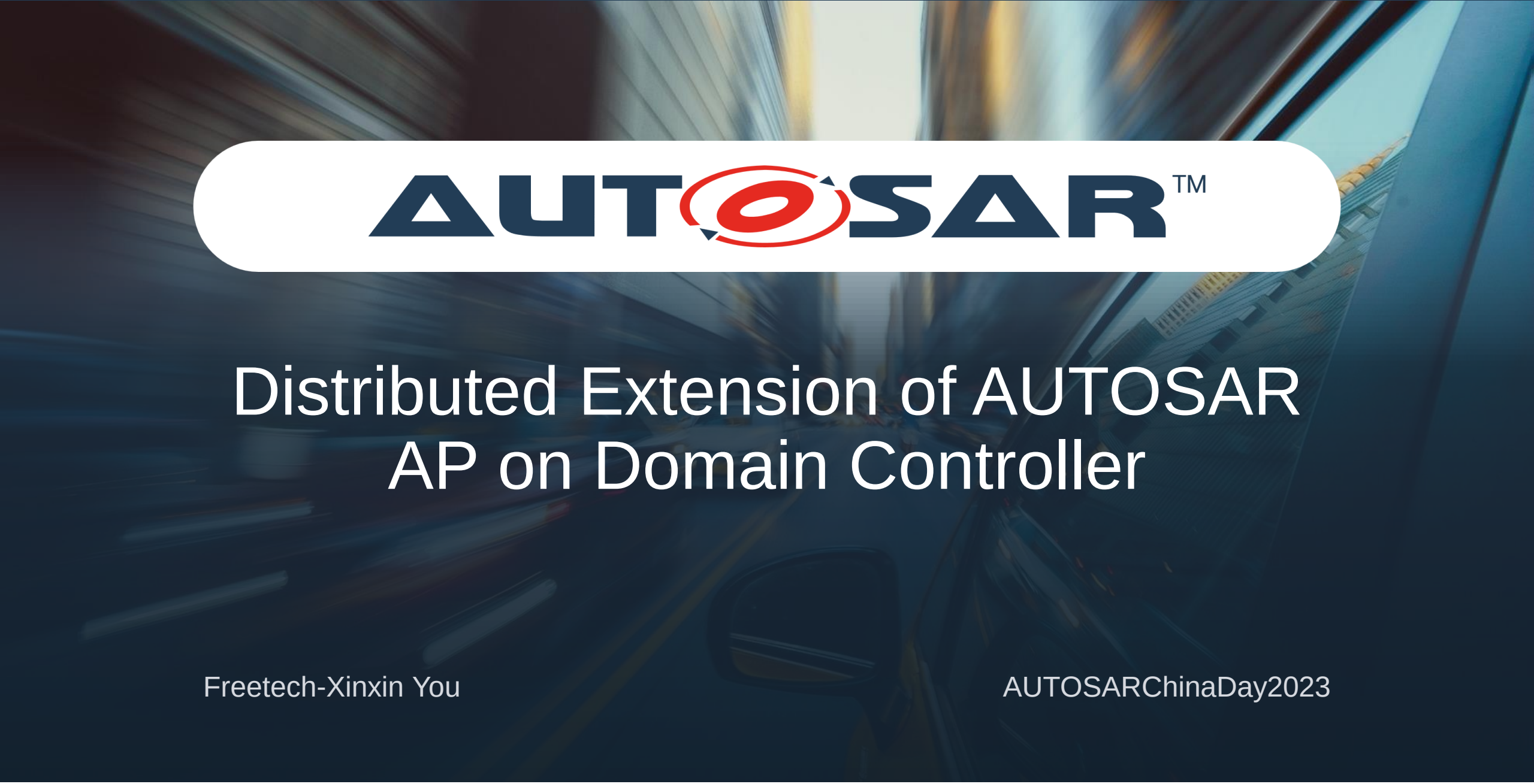


Distributed Extension of AUTOSAR AP on Domain Controller

Freetech-Xinxin You

AUTOSARChinaDay2023

BMW Group BOSCH Continental DAIMLER Ford gm PSA GROUPE TOYOTA VOLKSWAGEN AKTIENGESELLSCHAFT

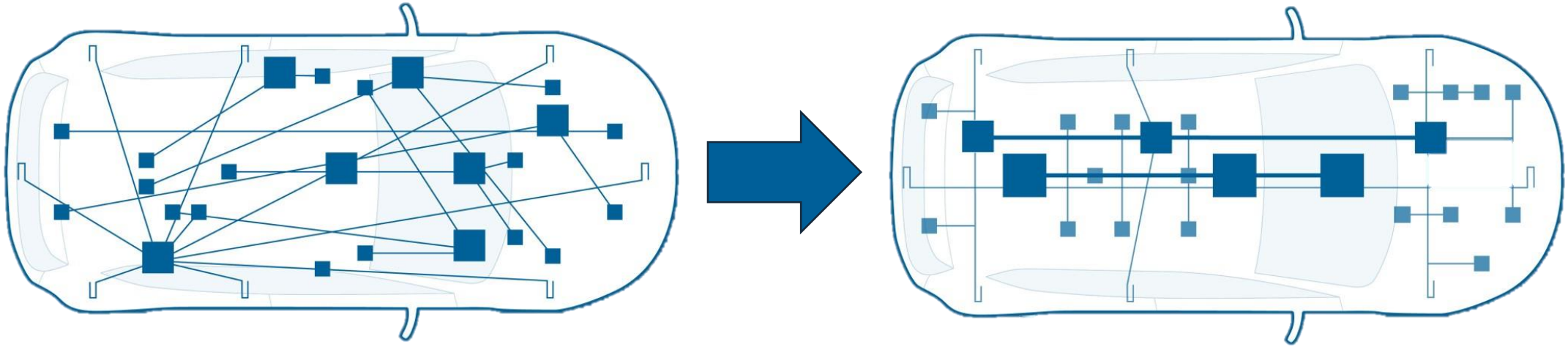
Agenda

- Generation of AUTOSAR AP
- Advantages and challenges of deploying AUTOSAR AP on domain controller
- Distributed extension of AUTOSAR AP
- Future outlook

Generation of AUTOSAR AP

Challenges brought by E/E architecture

Automotive E/E architecture evolves from distributed to centralized, bringing domain controllers



Generation of AUTOSAR AP

Domain controllers have higher requirements for software

Ethernet

High performance embedded SOC

OTA

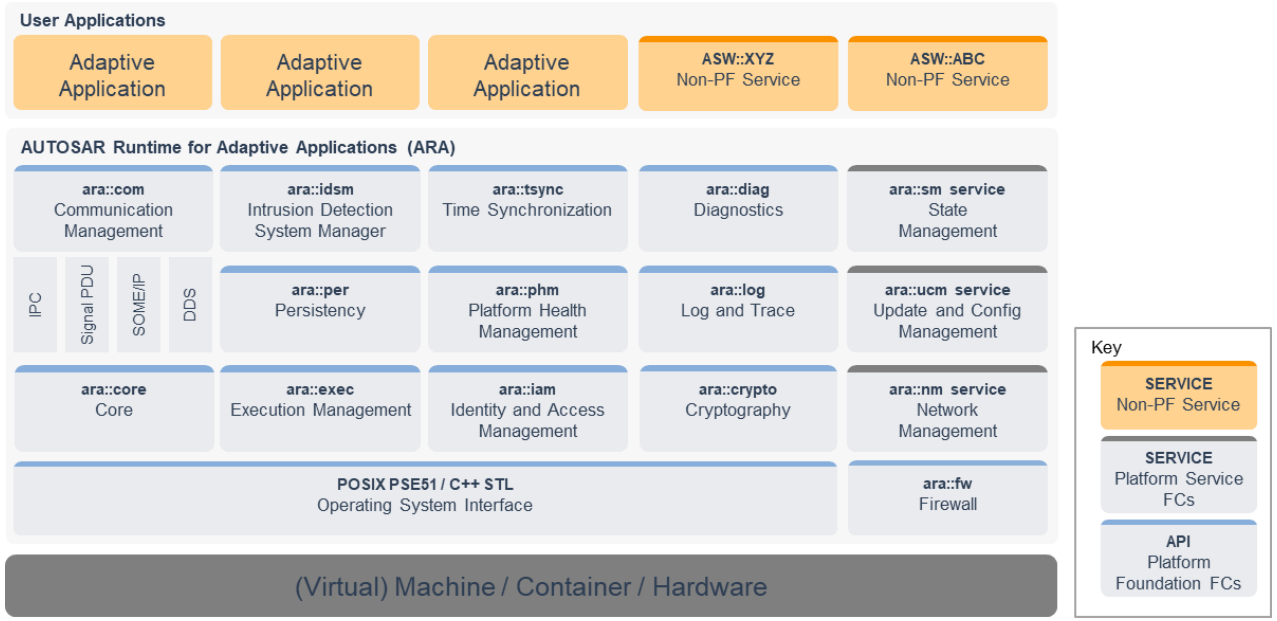
Continuous iteration

Increased complexity

Security

Safety

Compatible with industry specifications



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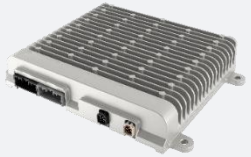
Advantages and challenges for deploying AUTOSAR AP on domain controller

Freetech ODIN domain controller

Freetech ODIN 1.0

ADC15
2022 Q2 SOP

- Low Performance
- 5V5R/6V5R
- ADAS L2+



ADC20
2022 Q3 SOP

- Shadow Mode

ADC25
2023 Q3 SOP

Highway+Parking

Freetech ODIN 2.0

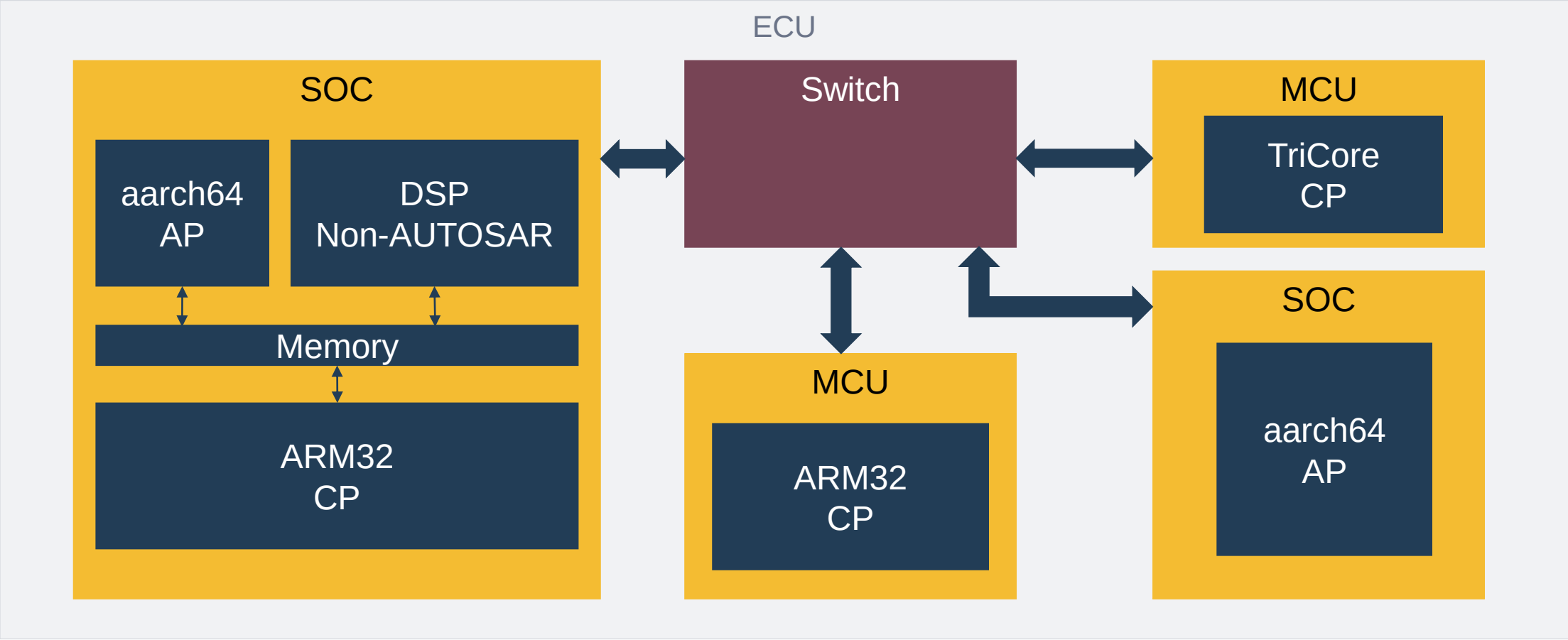
ADC X

- High Performance
- 12V5R + 1~3 Lidar
- L3+
- Data In-Loop

Highway+City+Parking

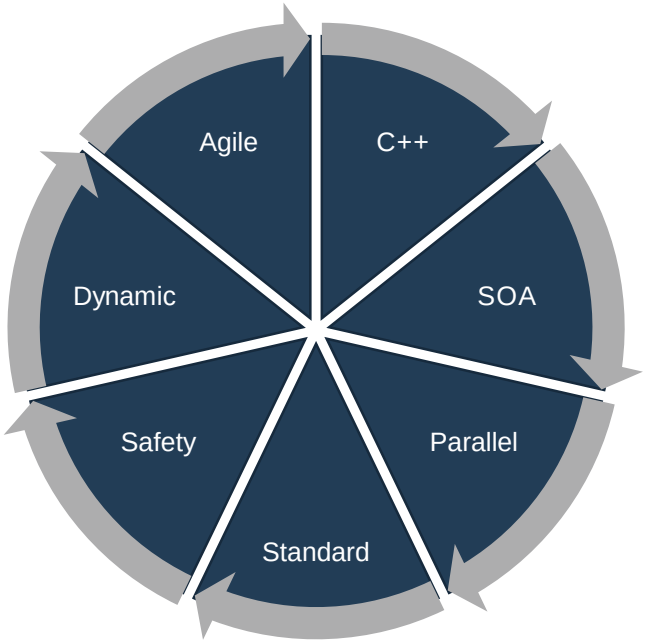
Advantages and challenges for deploying AUTOSAR AP on domain controller

Multi-Core/Multi-SOC software deployment



Advantages and challenges for deploying AUTOSAR AP on domain controller

Advantages



C++： It can adapt to new algorithms faster and improve application development ability

SOA： Service-oriented architecture to improve portability and achieve high performance

Parallel： More suitable for multi-core processors and distributed heterogeneous computing

Standard： Utilize the latest existing standards and adopt reuse and adjustment strategies

Safety： Support safety and security

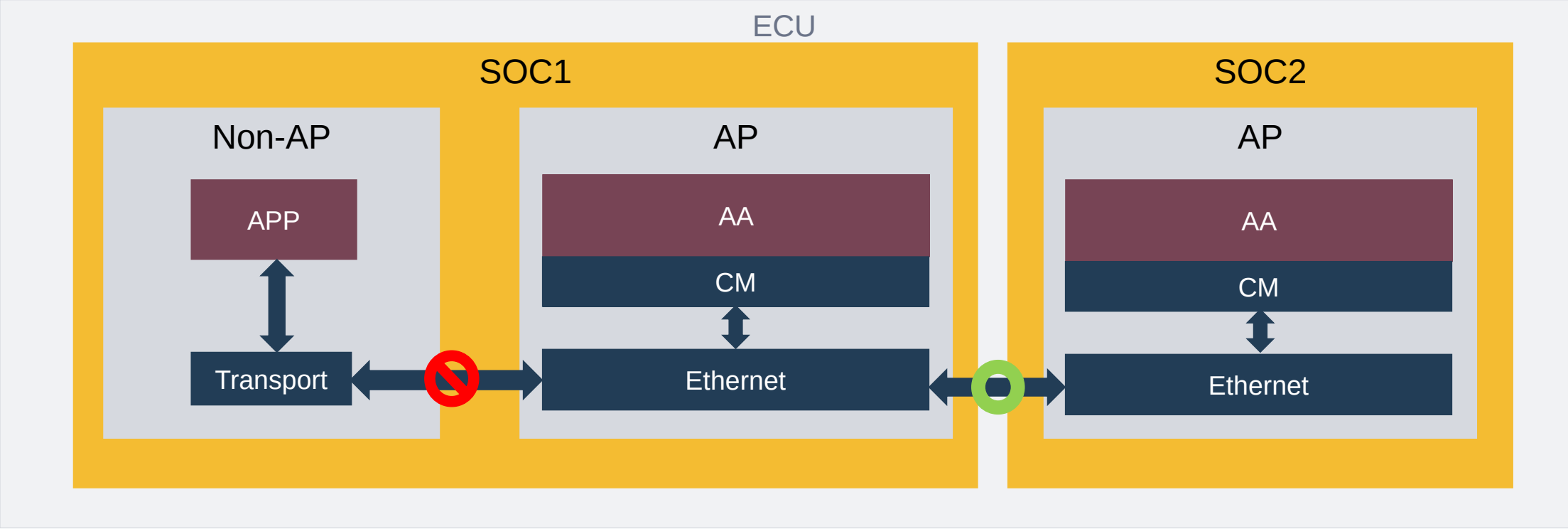
Dynamic： Support incremental deployment of applications, and dynamically manage resources and communications

Agile： Adapt to different product development processes, especially those based on agile

Advantages and challenges for deploying AUTOSAR AP on domain controller

Challenge：Distributed communication

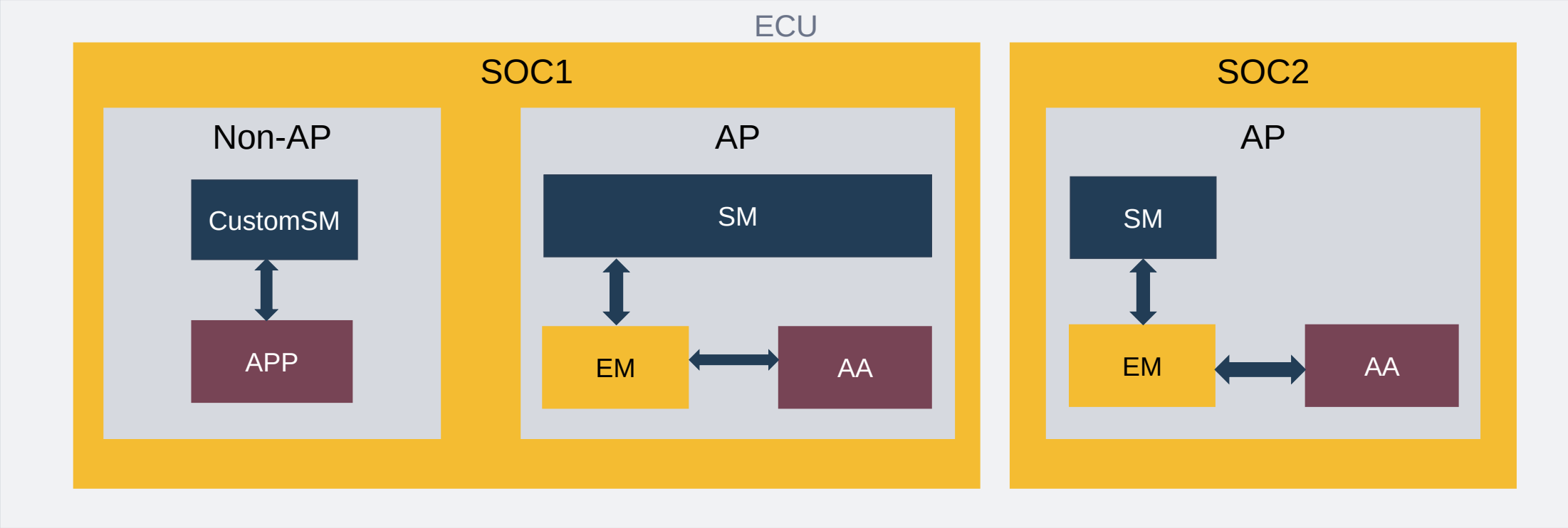
- Not all platforms support Ethernet communication.
- Only AA-level forwarding can enter the AP communication system and reduce performance



Advantages and challenges for deploying AUTOSAR AP on domain controller

Challenge：Distributed state management

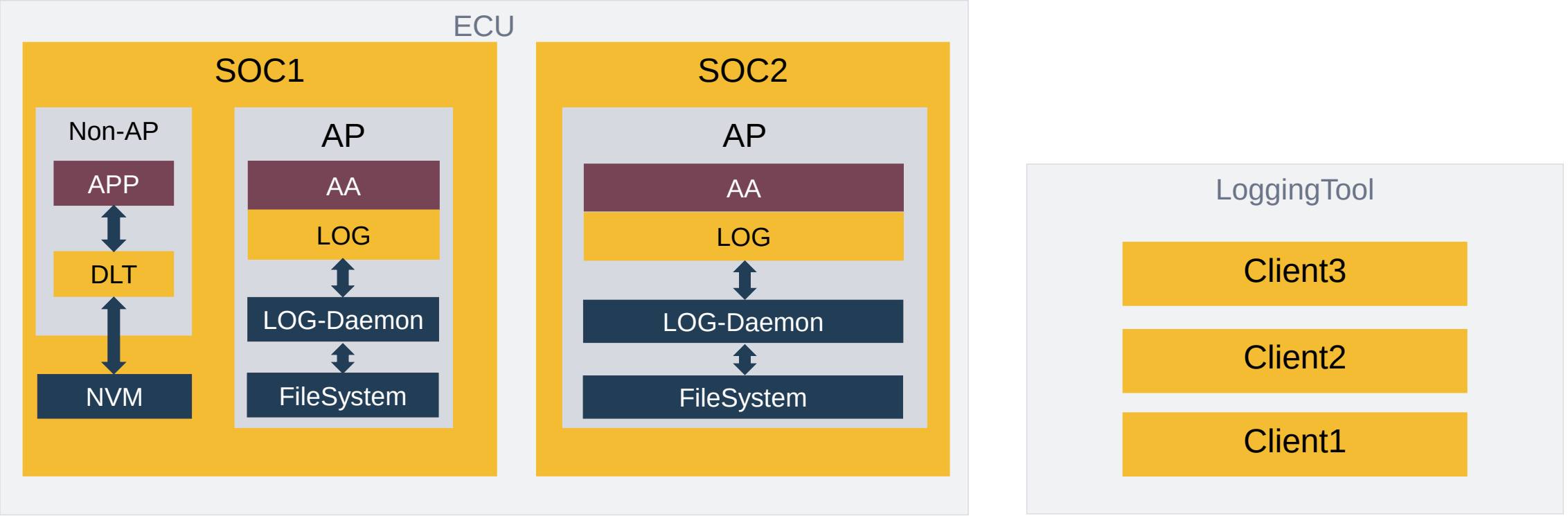
> Each platform is independent of each other, and users customize SM or AA to complete cooperation, ECU state is not related to function group status in AP system



Advantages and challenges for deploying AUTOSAR AP on domain controller

Challenge：Distributed log management

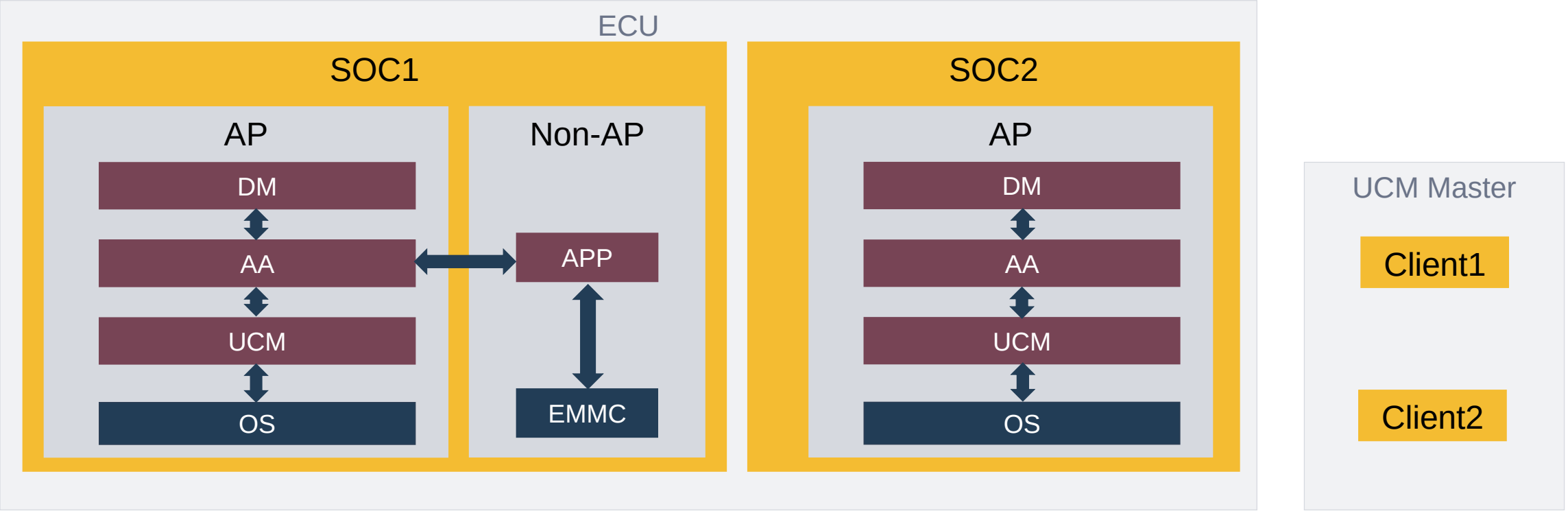
> Each platform processes its own log information and remotely accesses logs through different IP addresses



Advantages and challenges for deploying AUTOSAR AP on domain controller

Challenge： Distributed OTA management

> Each SOC has its own diagnostic address. UCM Mater control to upgrade each SOC separately, not the ECU-Level upgrading



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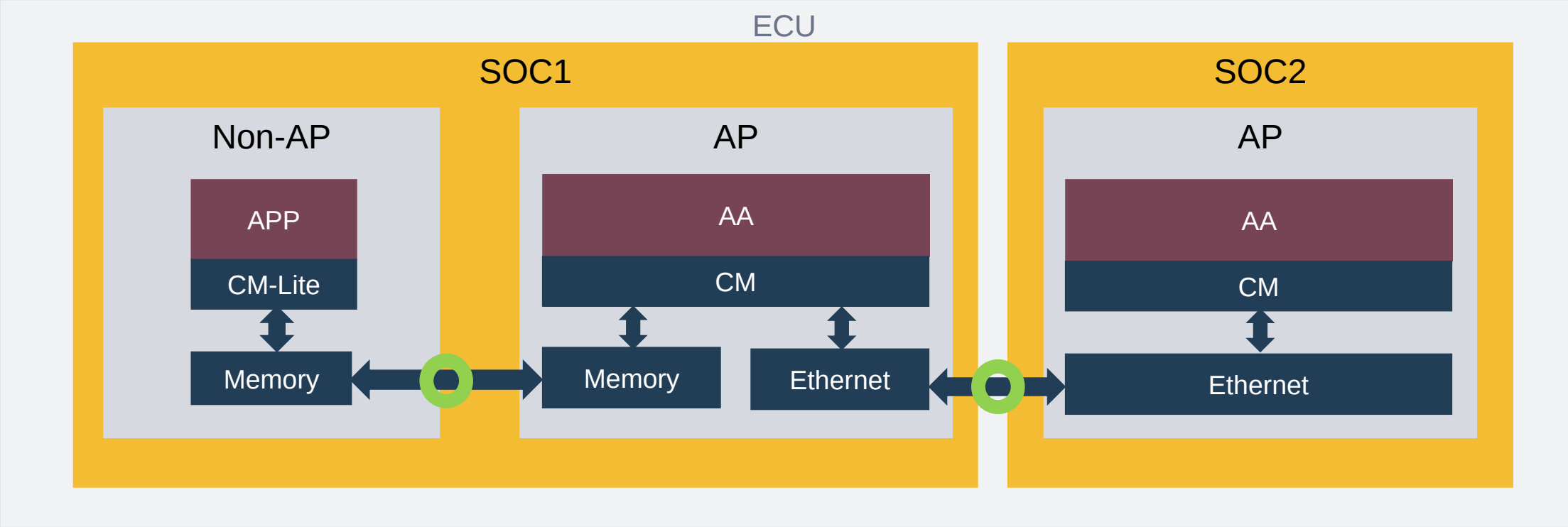
Distributed extension of AUTOSAR AP

Communication management: extension - support non-Ethernet communication

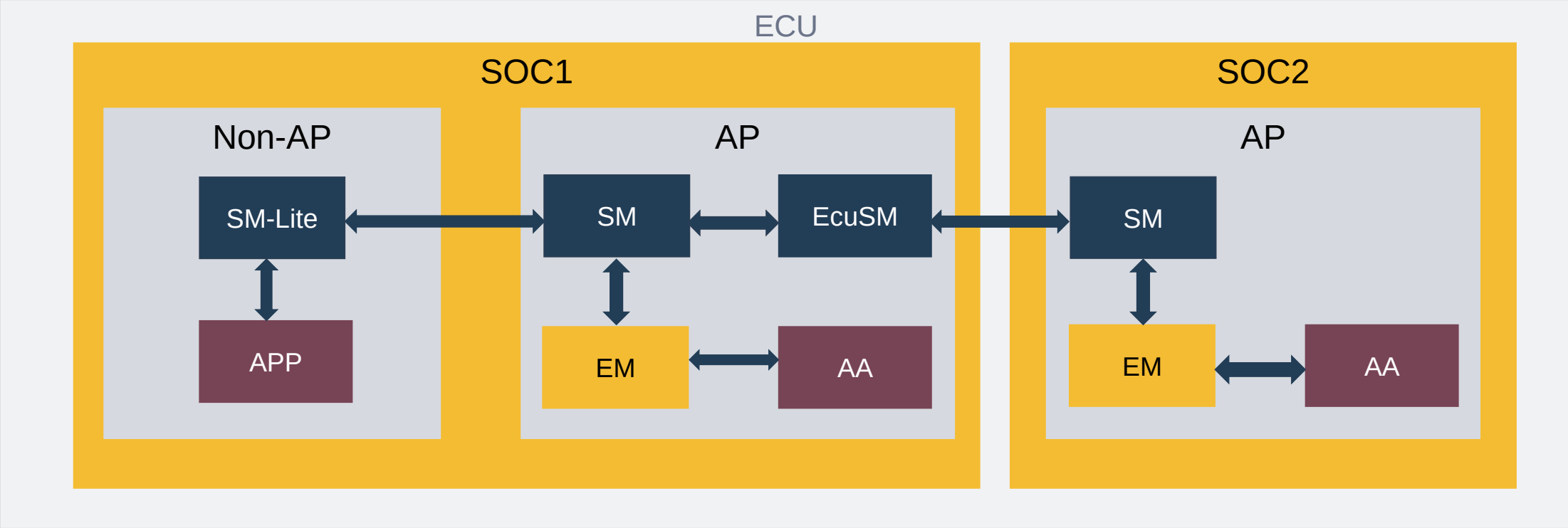
> Expand non-Ethernet communication in CM system, reduce forwarding loss at application level and improve portability



Distributed expansion of AUTOSAR AP

State/execution management: extension - establish a unified state machine at ECU level

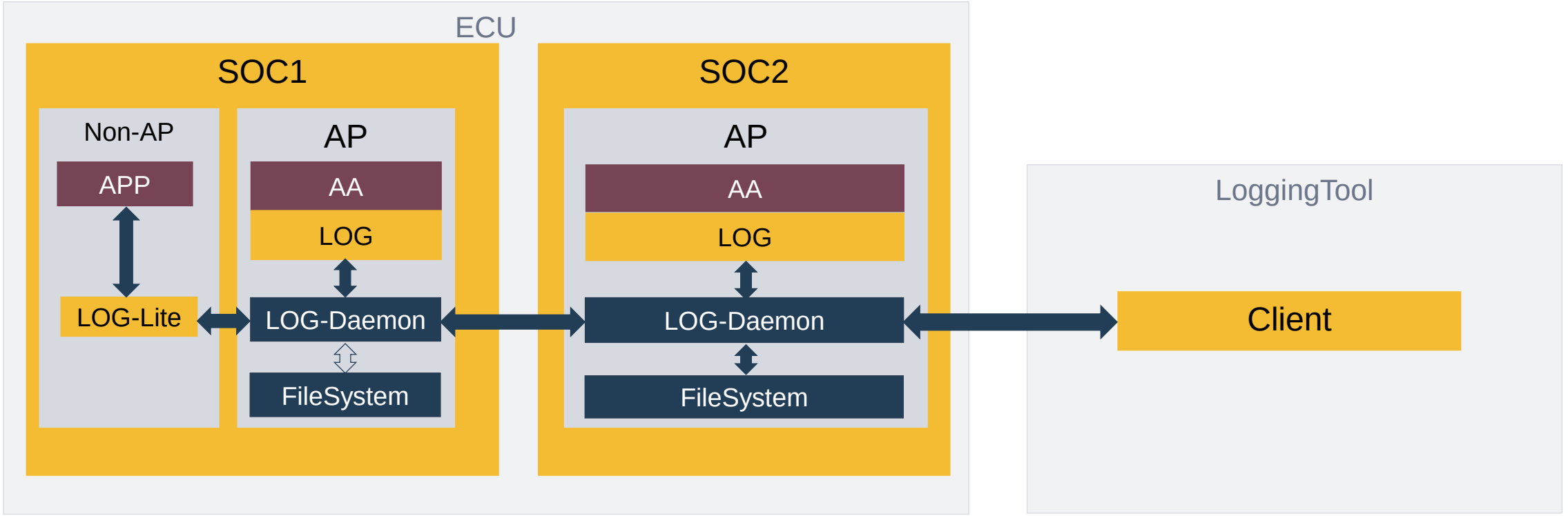
- All platforms are under a unified state management system
- Establish mapping between ECU status and function group status



Distributed extension of AUTOSAR AP

Log management: extension - support unified log management at ECU level

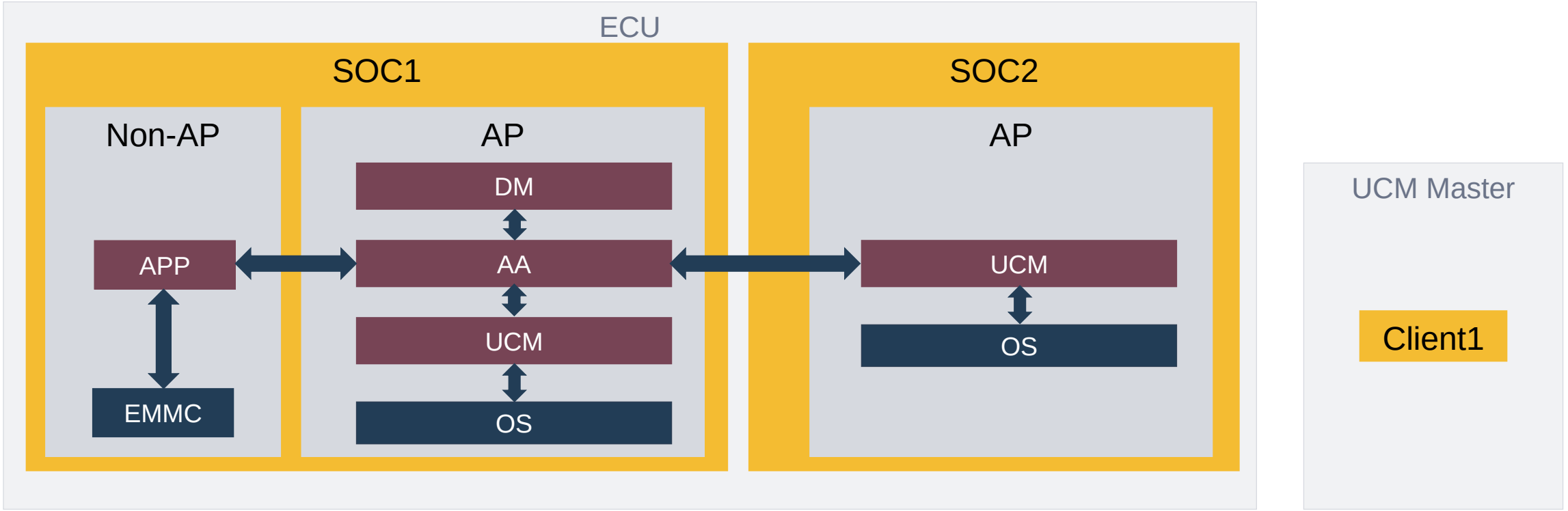
- Optimized log framework and non-AP platform log collection
- Access to all platform logs through one tool



Distributed extension of AUTOSAR AP

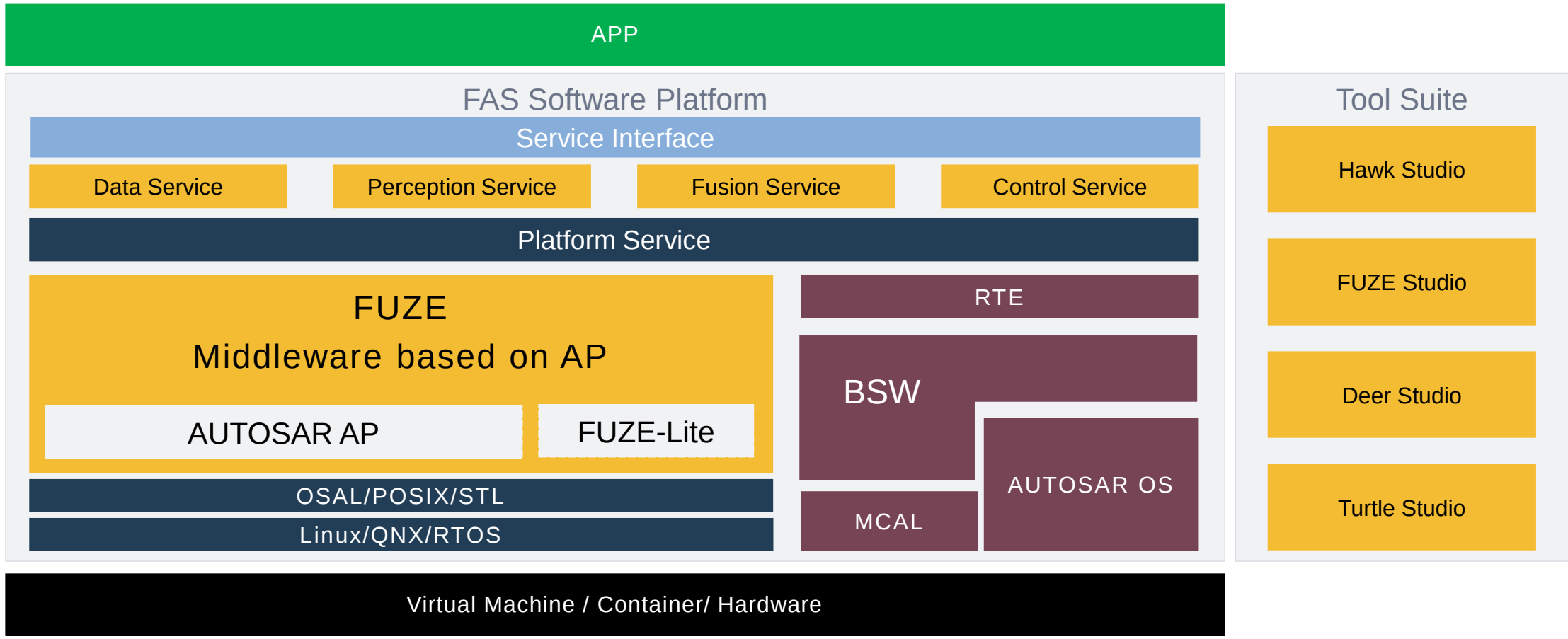
UCM: extension - support unified OTA management at ECU level

> Put the master control of ECU upgrade on one AP platform, cooperate with each platform to upgrade, and realize the unified upgrade of ECU level externally



Distributed extension of AUTOSAR AP

Based on AUTOSAR AP with distributed extension middleware - FUZE



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Future outlook

- Middleware based on AP platform will cover most domain controller development requirements
- AUTOSAR continues to succeed in China
- Freetech will continue to provide high-quality products and services with AUTOSAR

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