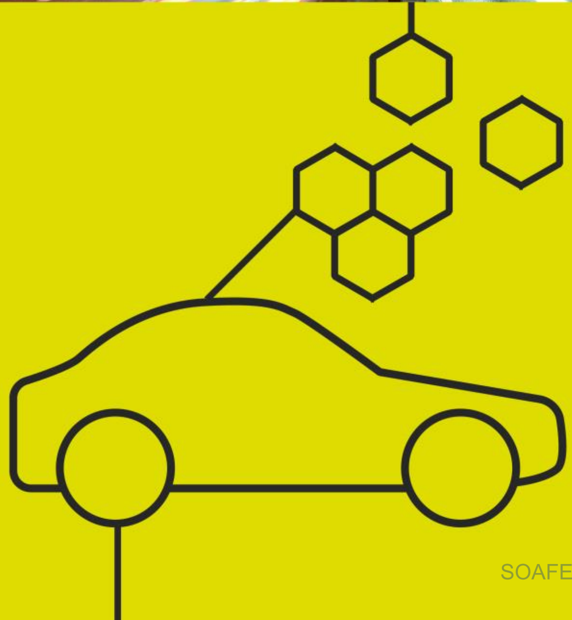
SOAFEE

Architectural Innovation Driving SDV Evolution

GAC's Framework Achieving Core Objectives & Advancing SOAFEE Implementation



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12-05-2025

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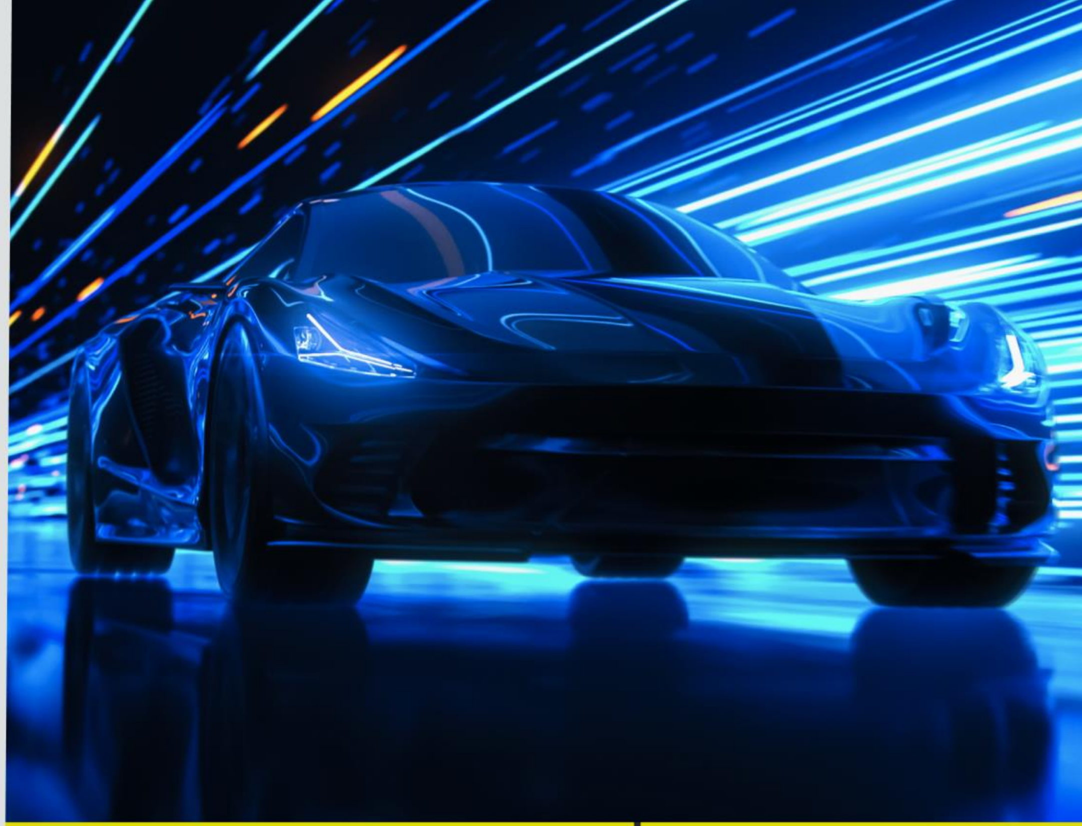

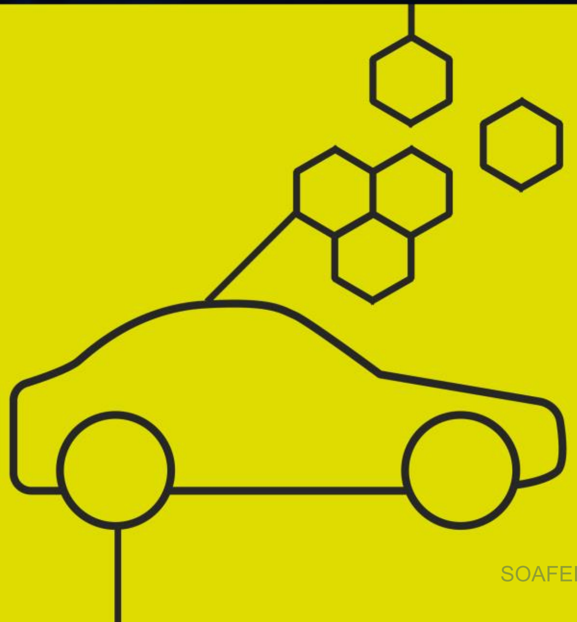

Why SDV?

Industrial Competition as primary driving force behind SDV

- ✓ Software development requires enhanced efficiency in face of
  1. More vehicle types: Dozens of vehicle types
  2. More functions: 1000+ functions
  3. Shorter time to market: 48 months down to 24, even 18 months
  4. More innovations: function fusion across different system
- ✓ Software development requires resilience in face of technology turbulence
  1. More chips/controllers
  2. More complicated EEA
  3. More and Newer technologies（AI……）

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SDV's Vision—OEM's Dreams

✓ Agile Software Development: (not only Scrum, SAFe)

1. Model driven development and verification
2. Parallel development for HW and SW
3. Virtual Simulation and Shift-Left testing

✓ Platform-Based Software Reuse to Improve ROI of SW Development

1. Software architecture decoupling HW and SW
2. Unified modeling method for different programmer

✓ Flexible Application Deployment to Any Node at Any time

1. Container technology/Dynamic Description of deployment

✓ Dynamic Compute Resources Allocation to Utilize HW Resources

1. Container technology

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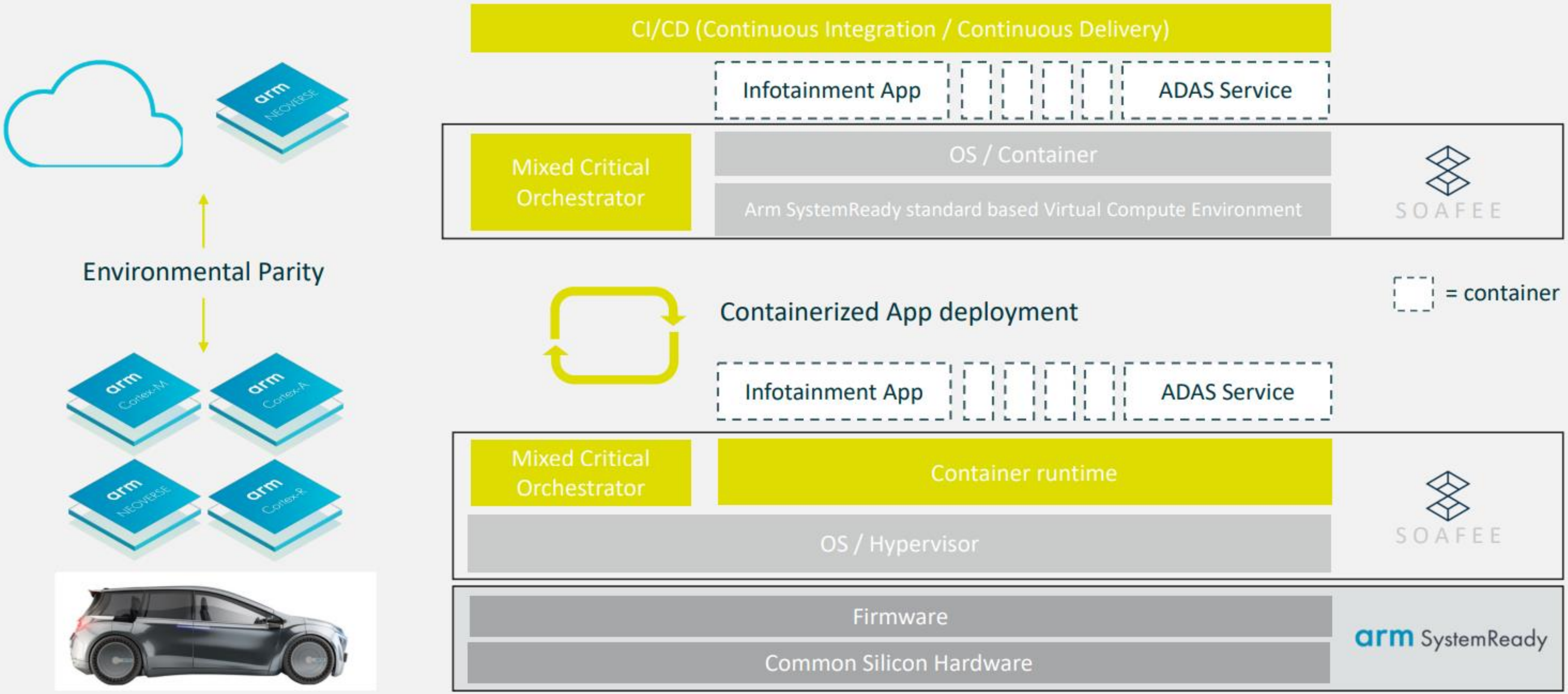
SOAFEE’s Reference



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How to Achieve SDV's Vision in GAC's Way

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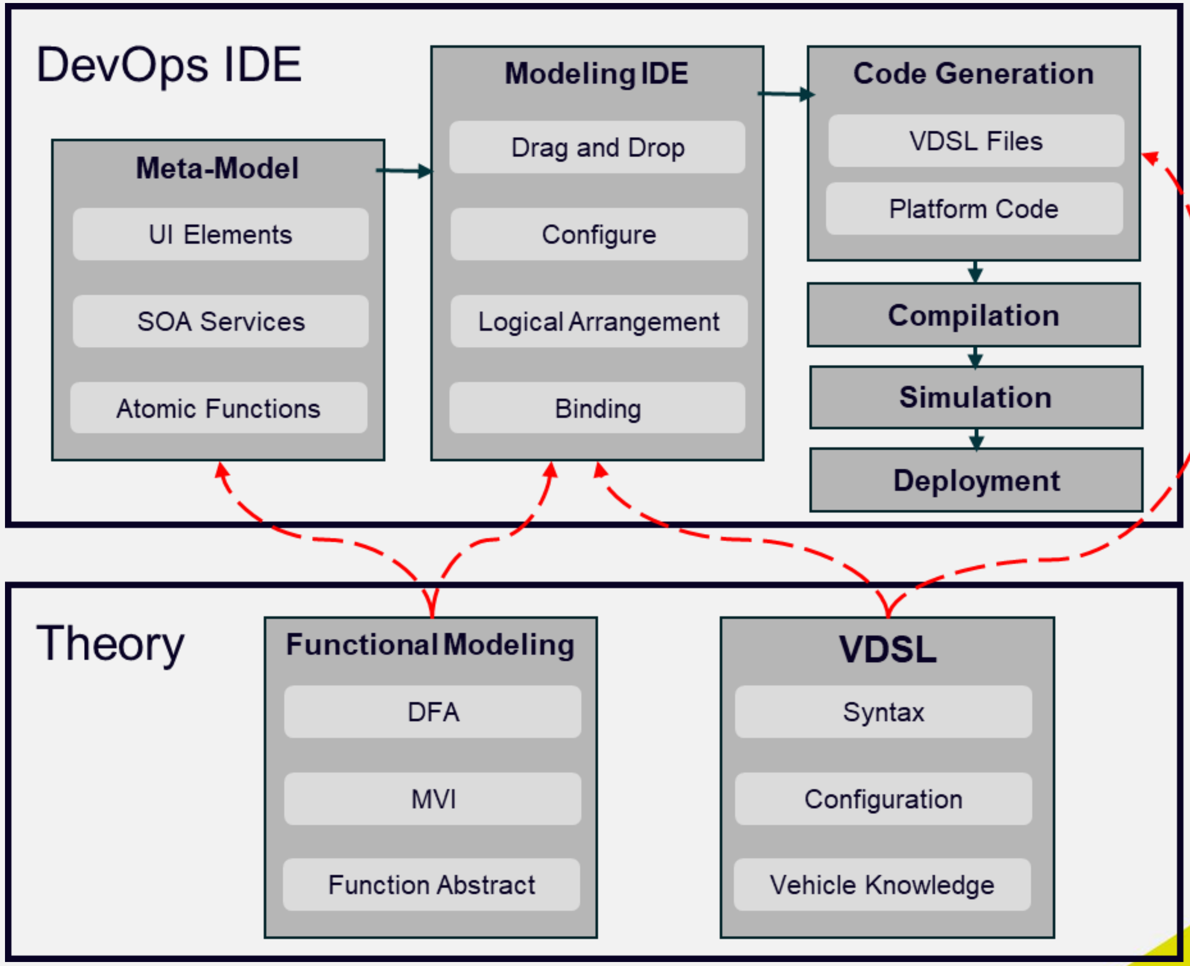
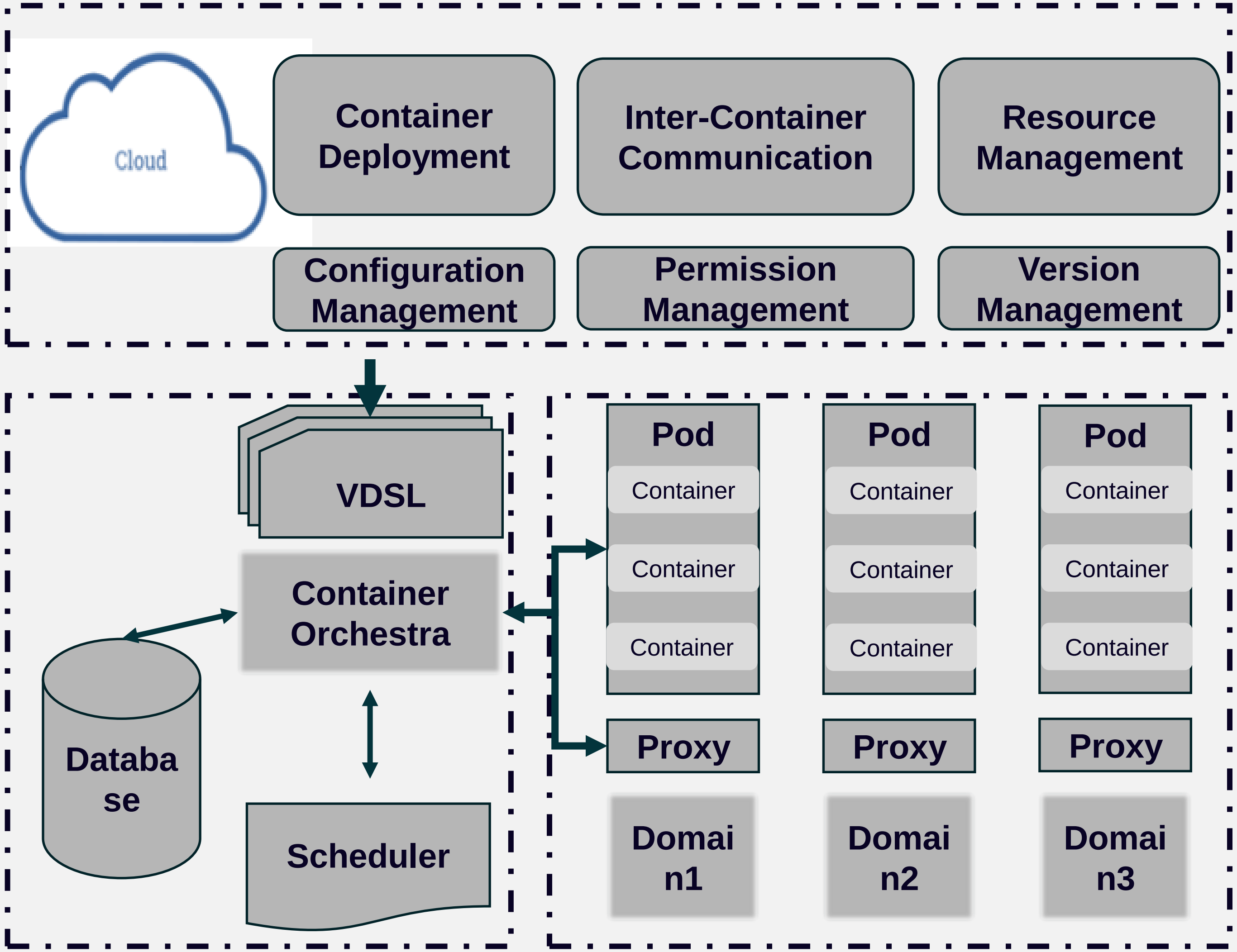
Novel Functional Modeling Theory and VDSL

- Novel Functional Modeling Theory for Vehicle Industry
  - Applicable for all systems such as...
  - Generate standard modeling result for different users
  - HW irrelevant
- VDSL (Vehicle Domain Specified Language)
  - Invented to describe the structure of function model
  - As an instance of SysML or DSL
  - Direct-runnable or Translatable to other languages (C++, JAVA, PYTHON…)
  - HW irrelevant
- DevOps IDE integrated modeling, code generating, simulation and deployment



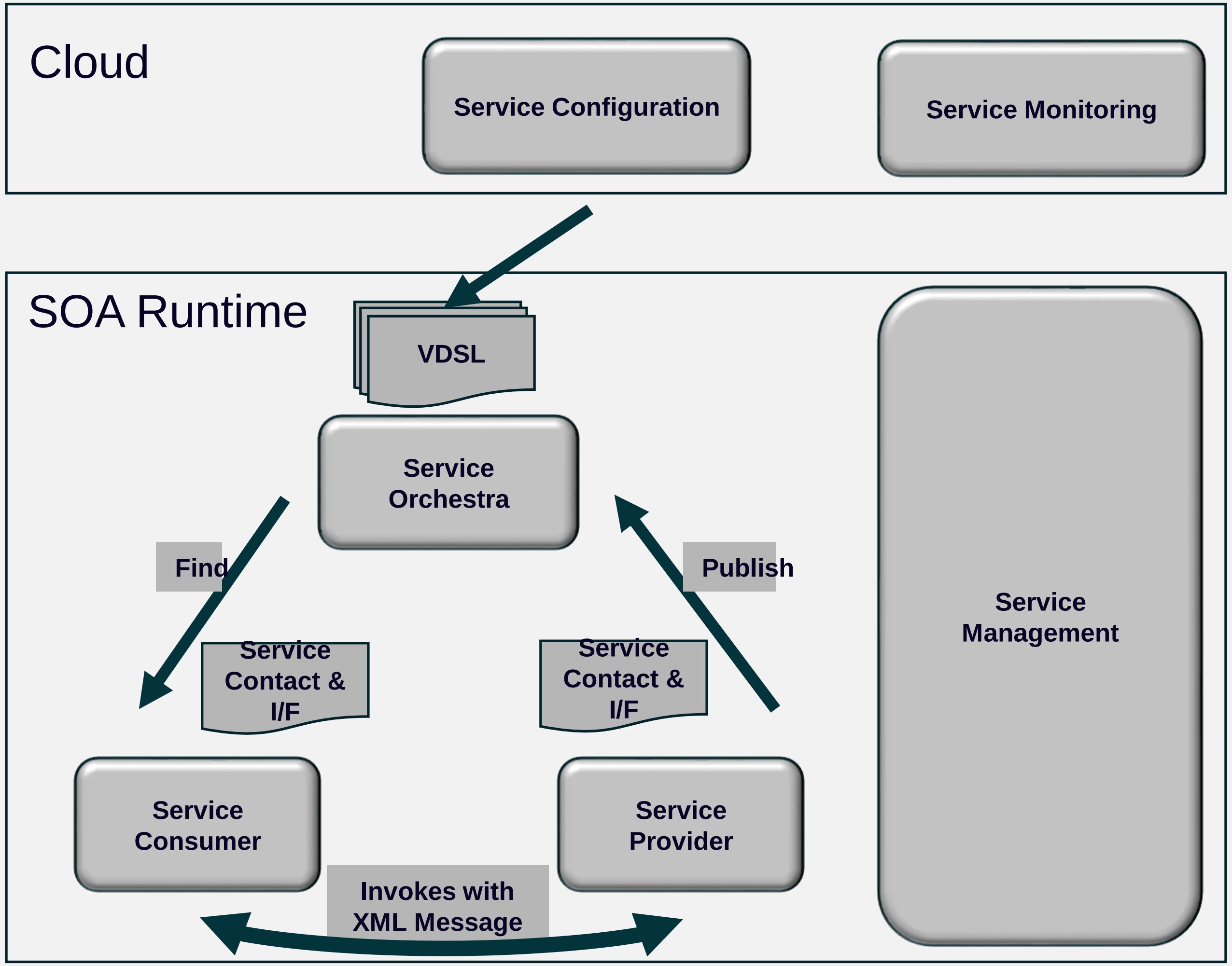
VDSL-Based Container Technology

- General Container
  - Lightweight and Efficient
  - Portability
  - Rapid Deployment
  - Isolation
  - Version Control
  - Environment Consistency
- VDSL-based container
  - Deployment configuration
  - Container Communication orchestra
  - Resource limitation
  - Secret and other security configuration
  - Version and dependency management



SW-HW Decoupling enabled by SOA

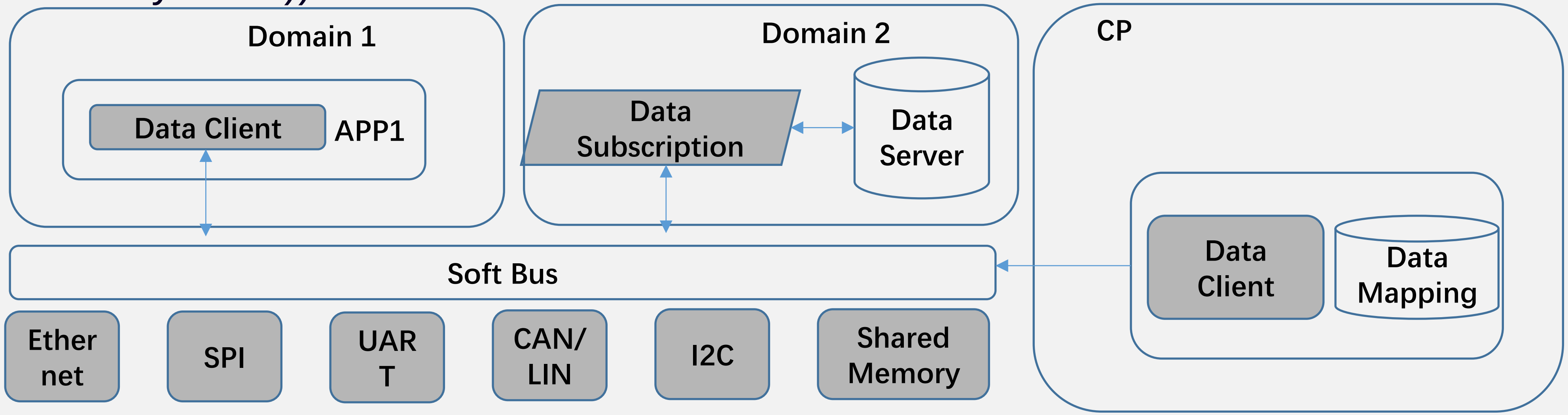
- Services as HW Abstract decoupling HW and SW
  - 2000+ Meta services
  - Hundreds of Combinational services
- SOA providing runtime and management of services
  - Applicable for A-core and M-core
  - Applicable for all systems on board and Cloud system
  - Applicable for EEA with Ethernet
  - VDSL based service orchestration and management, for example, service combination, service priority configuration.



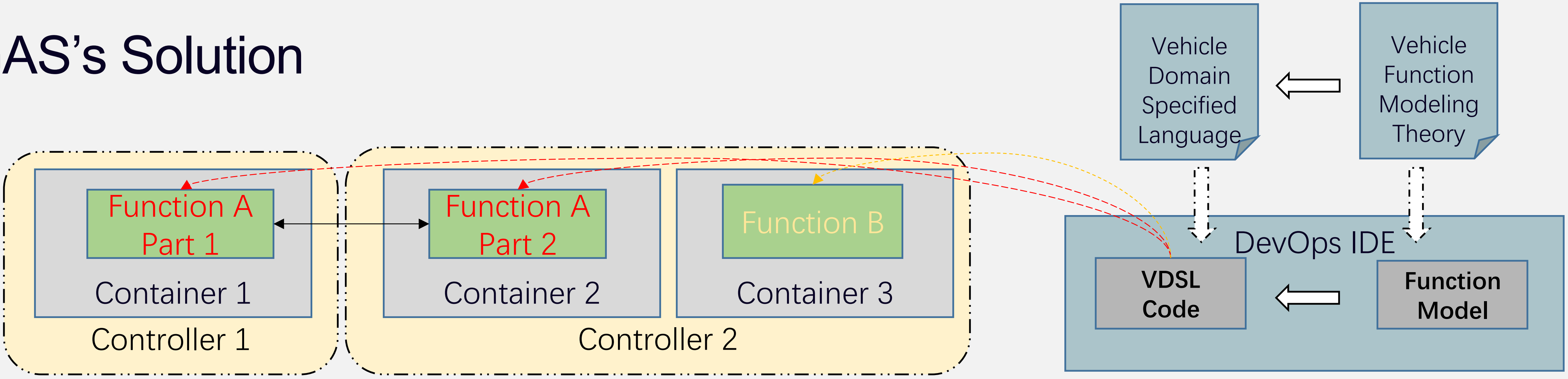
SW-HW Decoupling enabled by DOA

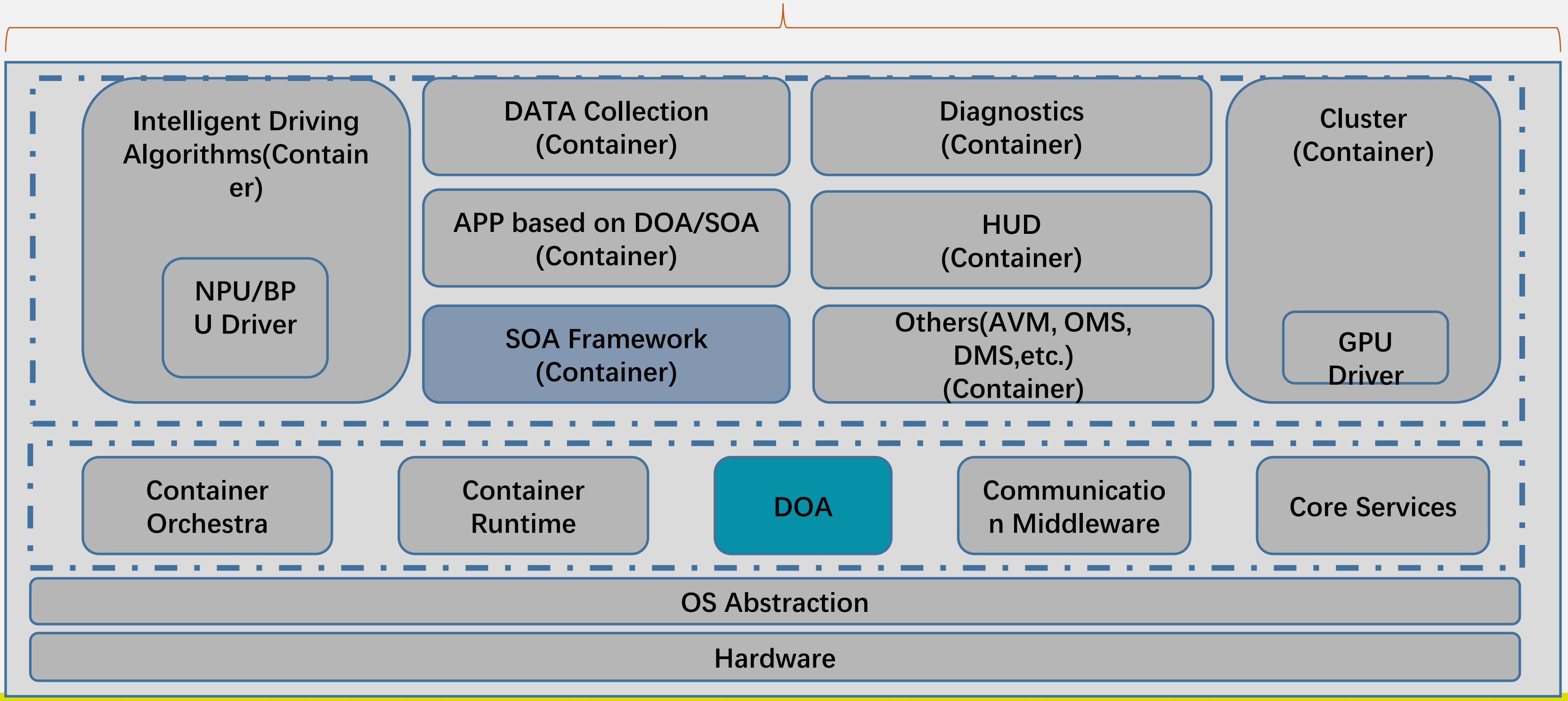
DOA (Data Oriented Architecture)

- Data as HW Abstract decoupling HW and SW
- DOA providing vehicle level management of data
  - Applicable for A-core and M-core
  - Applicable for all systems on board and Cloud system
  - Applicable for EEA with Ethernet, CAN, CANFD, LIN
  - Lighter than SOA(less consumption, less stack size, simplified data structure, less threads, less dependency of AP))



GAS's Solution





1. Containerization of the entire vehicle software sub-systems
2. Self-developed basic middleware supporting containerization
3. Lightweight DOA technology
4. Containerization orchestration specifications and standards based on VDSL
5. Containerization driver development for GPU/NPU/BPU

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Thank You