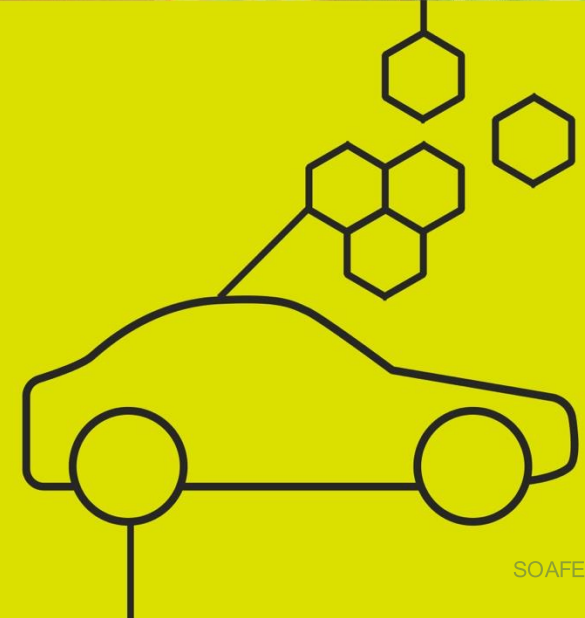


# High-Performance Container & Application Management Solution

Enabling Cloud-Native Performance & Automotive-Grade Determinism for SDV Domain Controllers

Ding Wang, Black Sesame Technologies  
2025-11



# Application Distribution & Management Challenges in SDV

## Complex Dependencies & Isolation

Applications from different suppliers have complex and potentially conflicting dependency chains. "Dependency Hell"?

## Mixed-Criticality Workload Integration

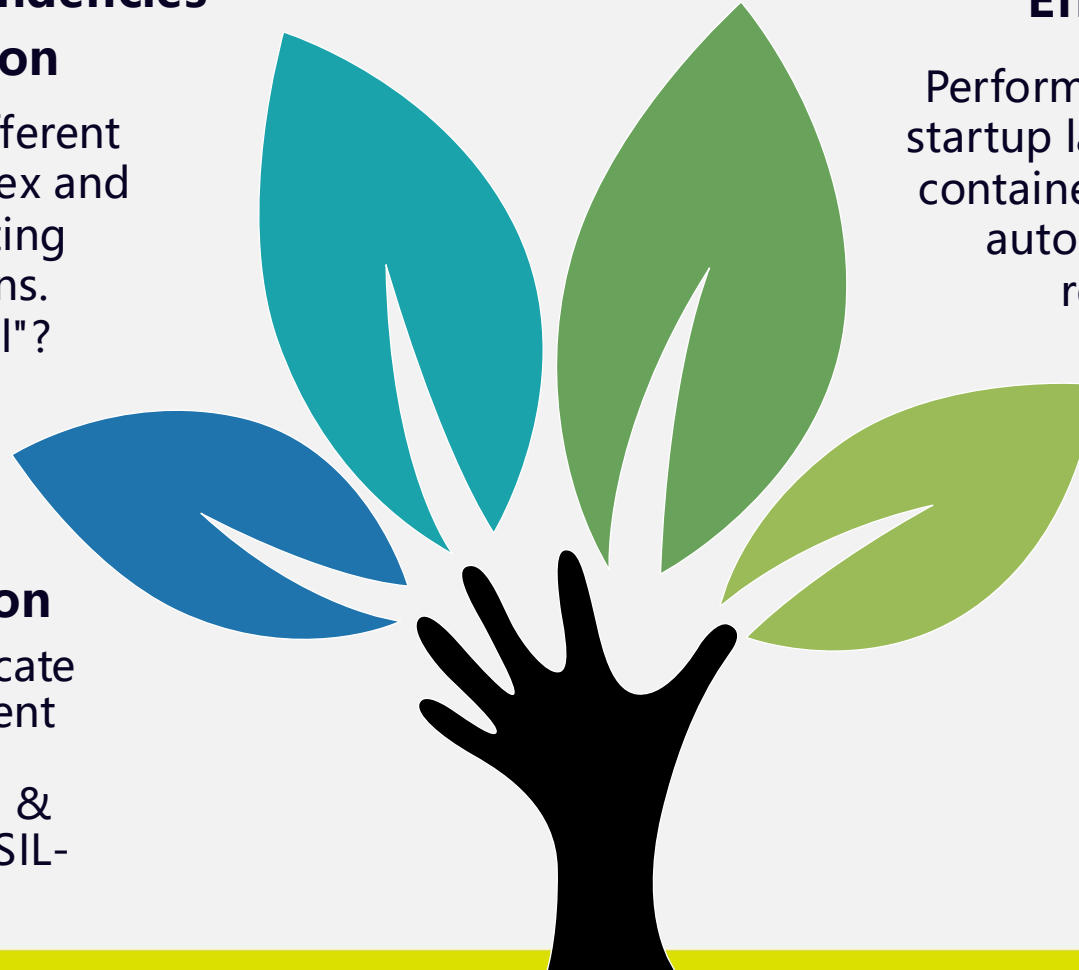
Safely and reliably co-locate applications with different safety levels .  
e.g., Infotainment [QM] & Autonomous Driving [ASIL-B/D]

## Performance & Efficiency

Performance overhead and startup latency by traditional containers struggle to meet automotive real-time requirements.

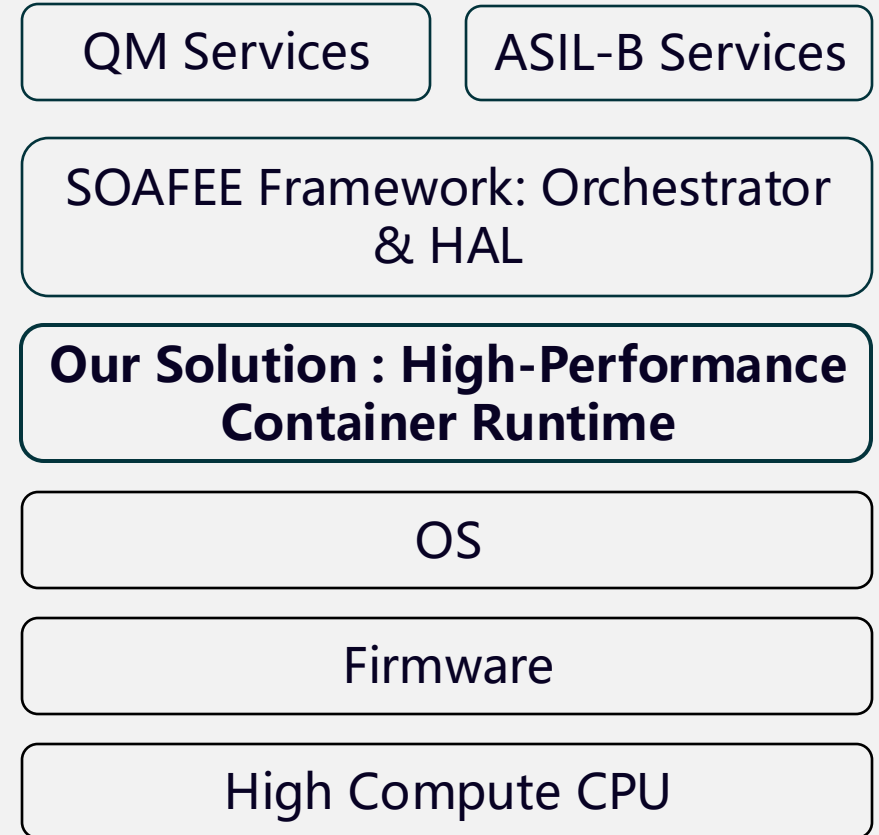
## Full Lifecycle Management

Lack of a standardized, end-to-end toolchain spanning development, debugging, deployment, and OTA updates.



# Our Solution: High Performance Container Runtime

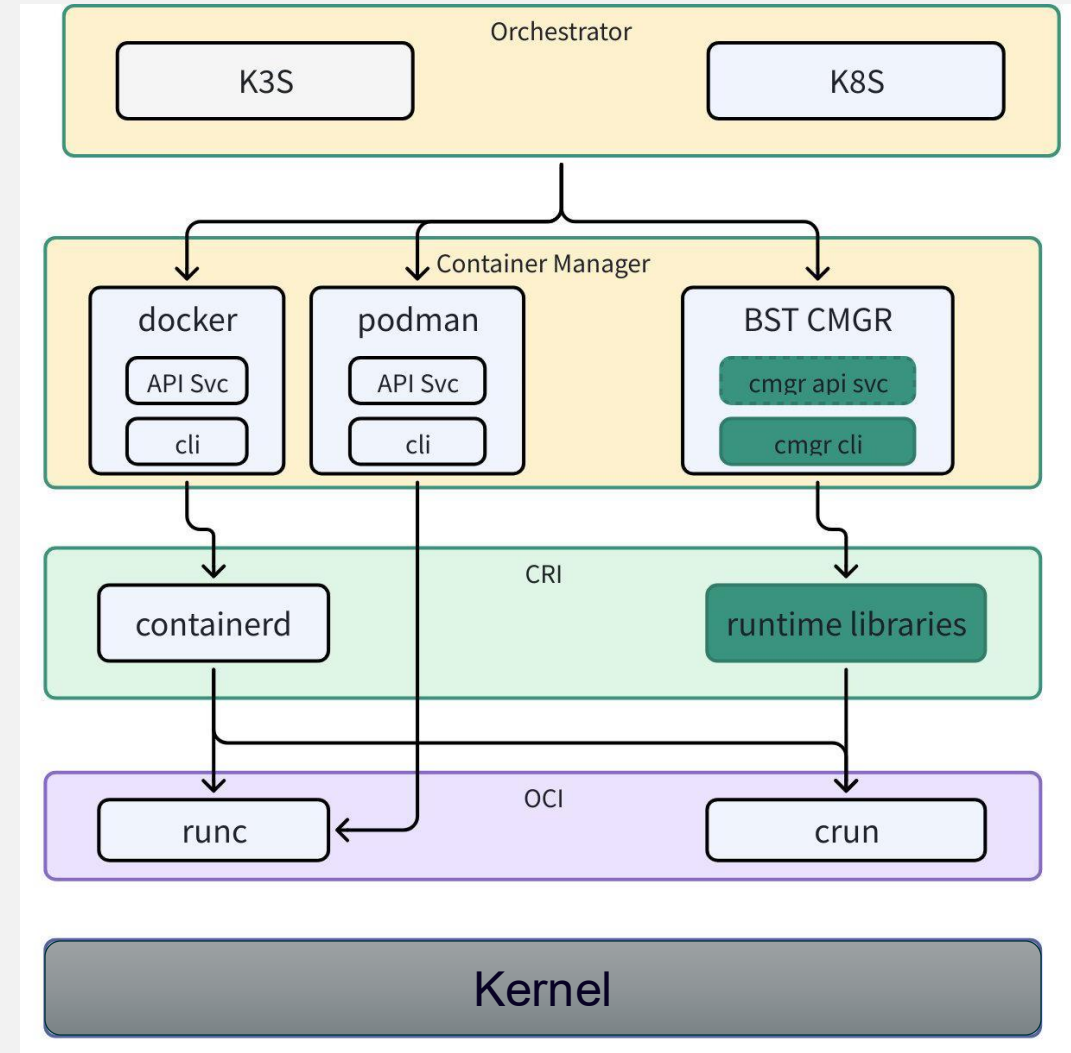
- **High-Performance Container Management Solution**
- A deeply optimized container runtime and toolchain, providing a high-performance, low-overhead underlying execution environment for the SOAFEE reference architecture.
- **Core Value**
- **Powering SOAFEE:** Ensures scheduling decisions from upper-layer orchestration frameworks are executed efficiently and reliably.
- **Mixed-Criticality Support:** Provides isolated runtime environments for applications of different ASIL levels through container isolation and resource constraints.



# Software Architecture & Performance

All test data below is based on the HuaShan A1000 EVB.

Container Manager	K3S	Podman	BST CMgr
Binary Size	125MB	36MB	537KB
First Start Time	3.08s	0.736s	0.274s
Mean Start Time	2.86s	0.227s	0.198s
EMMC Writing Loss	0.7%	2.14%	0.7%
Memory Bandwidth Loss	0.62%	0.35%	0.29%
Ethernet Bandwidth Loss	0.05%	0.45%	0.05%



# Technical Components & Developer Workflow

Provides an end-to-end cloud-native DevOps experience, consistent with the development paradigm advocated by SOAFEE.

## Development Phase

**New Project**  
Create project  
BST App Template

**Coding**  
Writing code with  
BST Manifest

**Build & Debug**  
BST Studio

## Integration & Deployment Phase

**Package**  
Build container  
BST Package Tool

**Release**  
Upload to cloud  
BST Cloud and  
Release tool

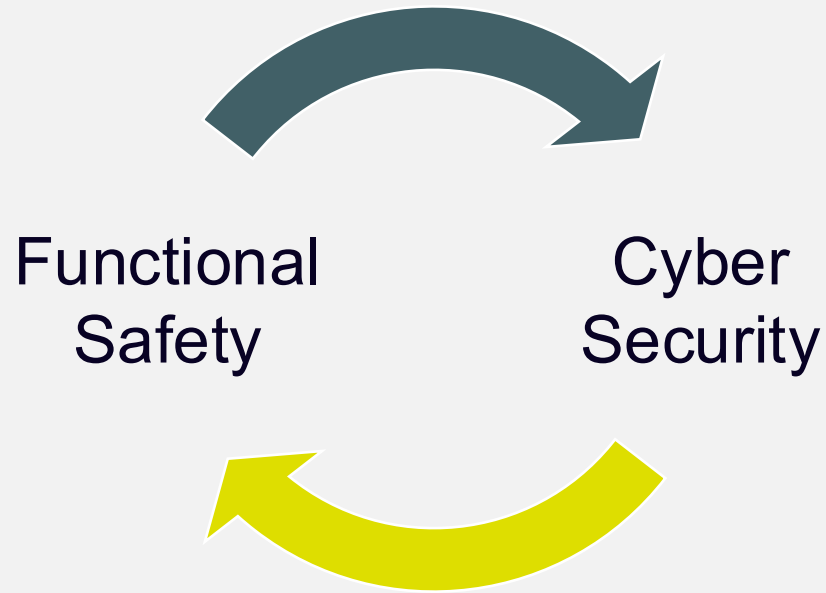
**In-Vehicle  
Deployment**  
BST Application  
Manager

## Maintaining Phase

**OTA**  
Update container  
BST SOTA Manager

**Status  
Monitoring**  
BST Application  
Panel

# Built-in Support for Cyber Security & Functional Safety



- **Cyber Security**
  - Enhanced signature verification, secure software supply chain, permission control mechanisms.
- **Functional Safety**
  - In-container and cross-container status monitoring



Thank You

