SOAFEE

Welcome to the

SOAFEE APAC Symposium

21st September 2023

SOAFEE is 2 this month !

New Arm technologies to transform the software-defined future for the automotive industry

September 15, 2021

News Highlights:

- Arm is delivering critical resources to accelerate the automotive industry's software-defined future with support from leading industry players including AWS, Continental, CARIAD and more
- SOAFEE, a new software architecture and open-source reference implementation, brings the real-time and safety needs of automotive together with the advantages of a cloud-native approach
- Two new reference hardware platforms will enable automotive workload exploration and testing on high-performance Arm-based silicon ahead of commercialization

Cambridge, UK, September 15, 2021 – Arm, in collaboration with leaders across the automotive supply chain, today announced it is delivering a new software architecture and reference implementation, Scalable Open Architecture for Embedded Edge (SOAFEE), and two new reference hardware platforms to accelerate the software-defined future of automotive.

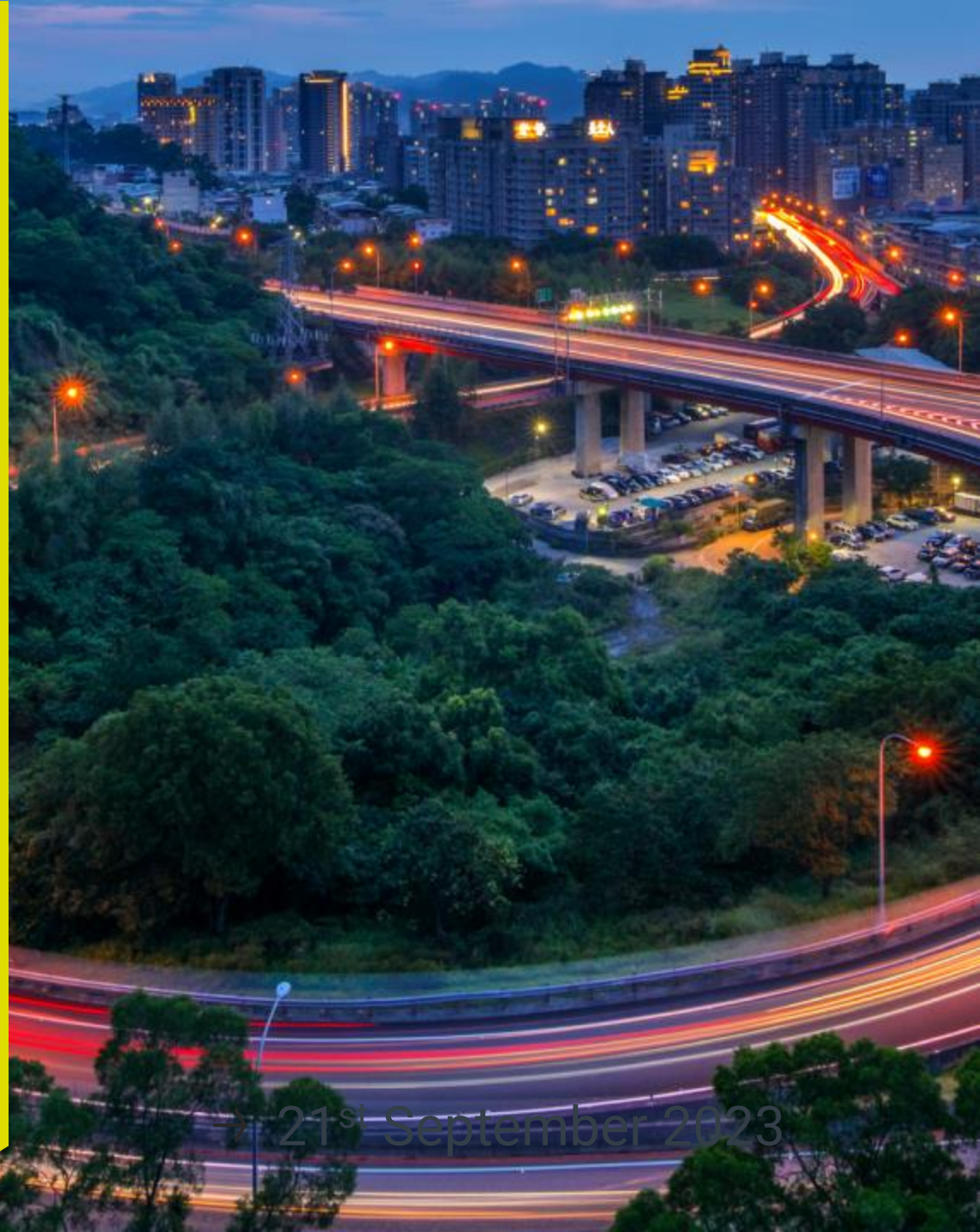
Agenda

08:30-09:00	Registration
09:00-09:10	Opening
09:10-09:50	SOAFEE Updates
09:50-10:00	Break (10 mins)
10:00-10:30	Partner Session 1 - Denso
10:30-11:00	Partner Session 2 - Panasonic
11:00-11:30	Partner Session 3 - Hitachi Astemo
11:30-12:30	Lunch (60 mins)
12:30-13:00	Partner Session 5 - AWS
13:00-13:30	Partner Session 6 - AWF
13:30-13:40	Break (10 mins)
13:40-14:10	Partner Session 7 - Renesas
14:10-14:40	Partner Session 8 - LG Electronics
14:40-14:50	Break (10 mins)
14:50-15:20	Partner Session 9 - Thundersoft
15:20-15:50	Partner Session 10 - Black Sesame
15:50-16:20	Partner Session 11 - Linaro
16:20-16:30	Break (10 mins)
16:30-17:00	Panel Discussion
17:00-18:30	Social Gathering

SOAFEE

SOAFEE Update

Robert Day



21st September 2023

SOAFEE

Scalable **O**pen **A**rchitecture **F**or **E**mbedded **E**dge

An **industry initiative** to extend cloud-native software experience to automotive workloads, incorporating a **Special Interest Group** (SIG)

A **software architecture** which enables cloud technologies to be combined with automotive functional safety and real-time requirements for the first time

An **open-source reference software implementation**, enabling prototyping and early development, starting now

SOAFEE

SOAFEE Membership

- **89** WG Members announced and 7 GB members: **Total 96 announced**
- **12** members still to be announced
- Total **108** Signed Members
  - OEMs and Tier 1s
  - Silicon partners
  - OSVs, ISVs and CSPs
  - System Integrators
  - Technology providers
  - Academic institutions
  - Automotive consortiums

Governing Body Members

arm

aws

BOSCH

CARIAD
A VOLKSWAGEN GROUP COMPANY

Continental

Red Hat

SUSE

Voting Members

SOAFEE Workgroup Structure

- Define the strategic direction and goals of the SOAFEE SIG
- Provide oversight to SOAFEE SIG execution
- Vote on technical and marketing proposal recommended by TSC and MSC
- Promote the use of SOAFEE within relevant ecosystems

Governing Body (GB)

Chair: Bill Foy, AWS

- Drive SOAFEE technical vision, architecture and execution
- Main coordinating body across workgroups
- Primary technical interface into Governing Body and MSC

Technical Steering Committee (TSC)

Chair: Matt Spencer, Arm

SIG Community Manager

Estela Rey Ramos, Arm

Marketing/GTM Steering Committee (MSC)

Chair: Robert Day, Arm

- Marketing Plan
- SOAFEE external messaging
- Marketing collateral
  - White papers
  - Website
  - Presentations
  - Social media
- Marketing events
- GTM outreach
  - Ecosystem
  - Consumers
- Roadmap/milestone approval

Architecture WGs

System Architecture

Chair: Martin Stamm, Continental

- Define , analyze and decompose use cases
- Define system software requirement to be addressed by Cloud Native working group

Cloud Native

Chairs: Neel Mitra, Luke Harvey, AWS

- Define standards adoption/extensions to mixed critical workload portability and environmental parity across cloud to automotive edge
- Define orchestration of cloud native mixed critical workload across cloud and automotive edge
- Define CI/CD integrated development tools & virtual execution environment

Hypervisor

Chair: Francois Ozog

Assemble technical knowledge related to virtualisation for a SDV platform. The technical knowledge can take the form of best practices/patterns documents that can be used by SDV value chain, standardisation or open source groups.

MCO Tiger Team

Chair : Andreas Faerber SUSE

Reference Implementation

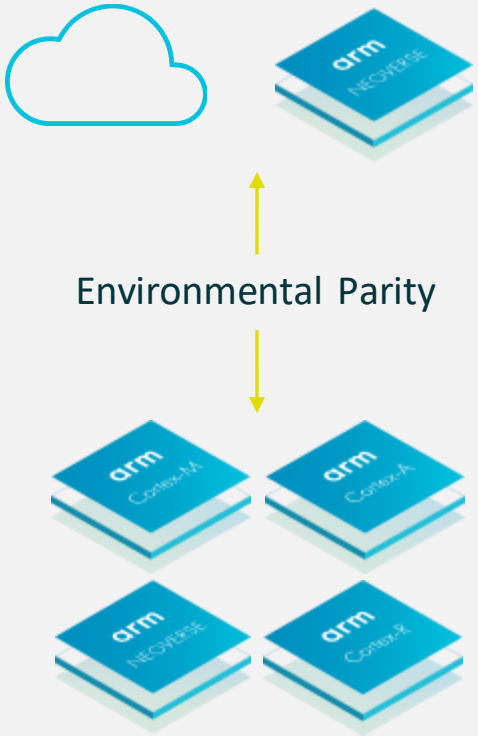
Chair : Anmar Oueja, Linaro

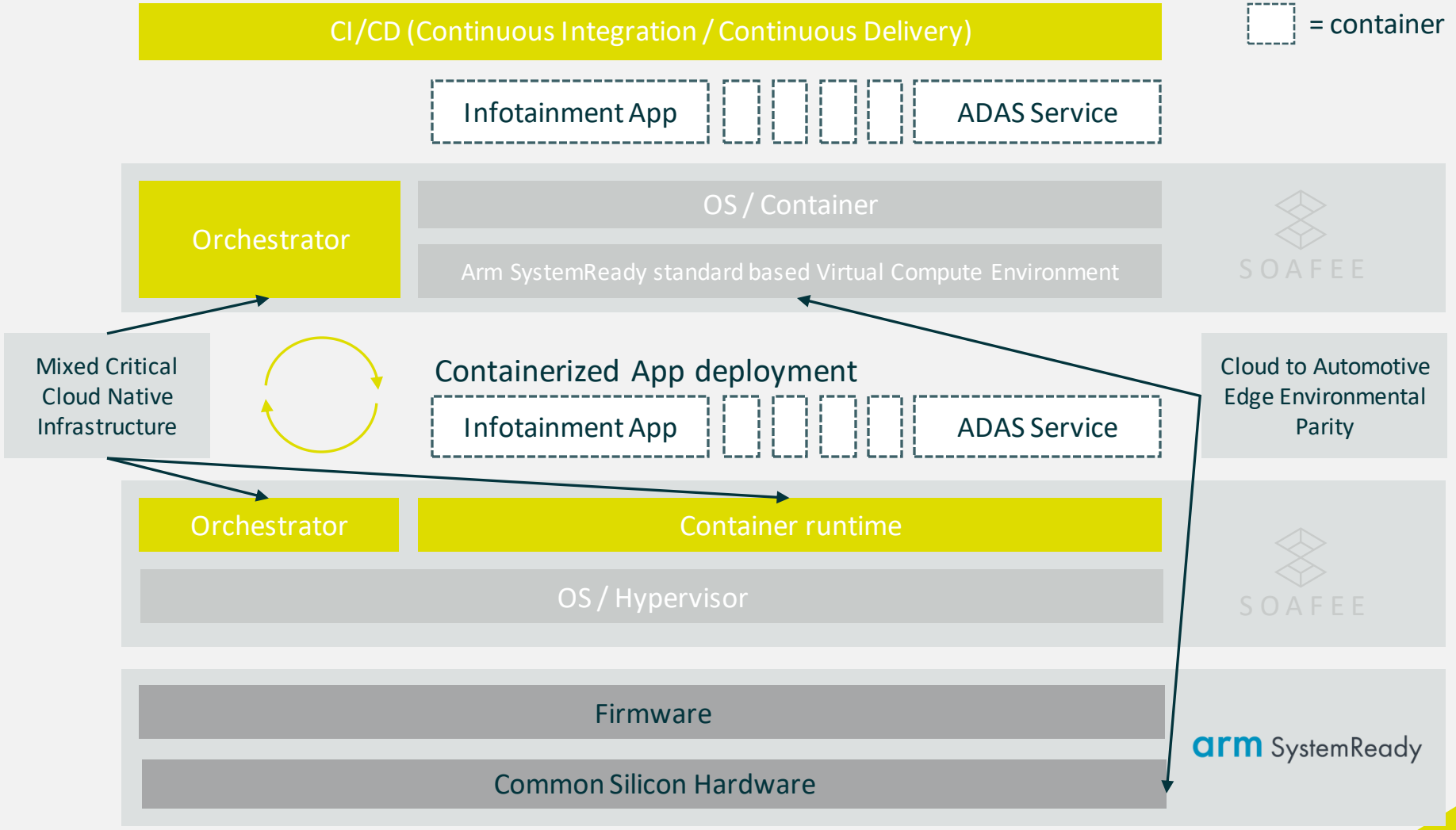
- Drive reference implementation of SOAFEE automotive stack with requirements defined by Architecture working goups
- Drive integration and validation lab for partner platforms
- Create technology demonstrators based on the technical scope created by the Arch WGs

Blueprints Tiger Team

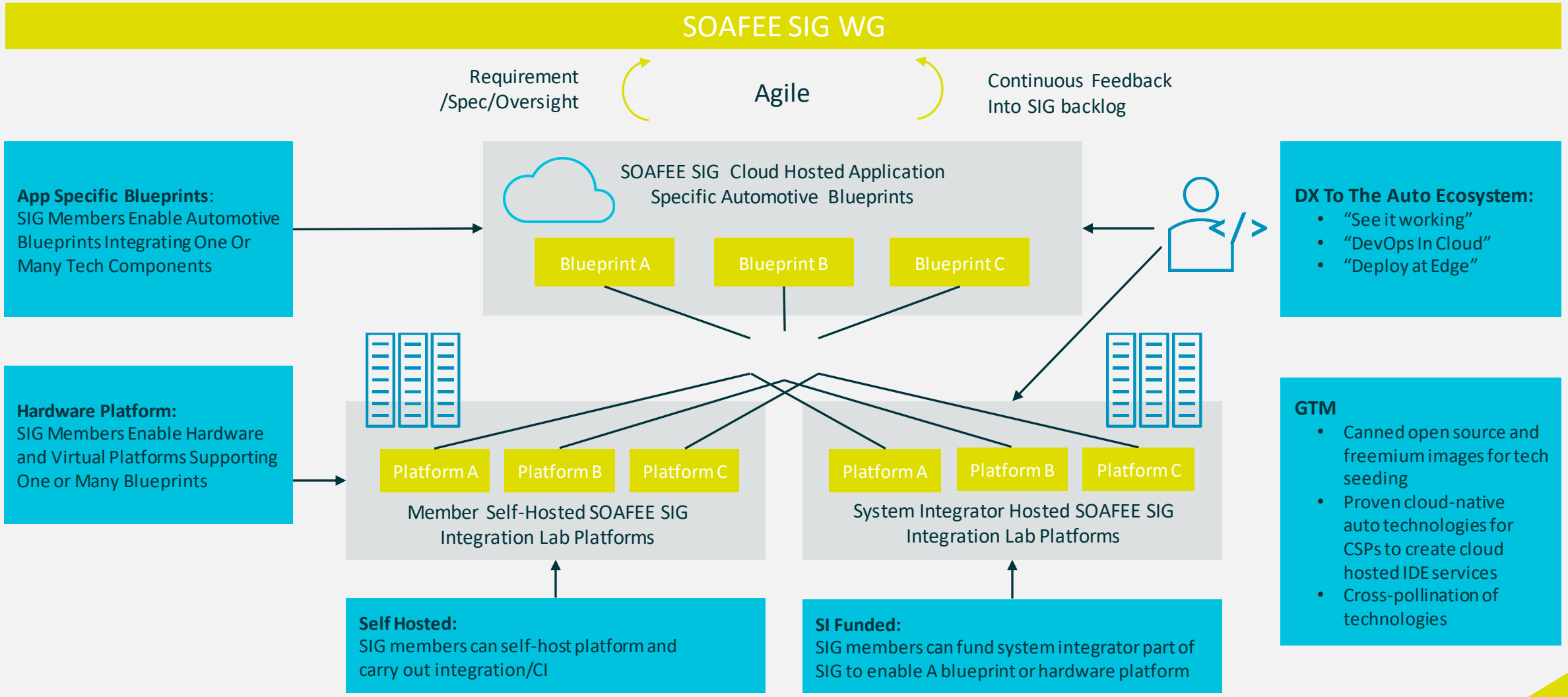
Chair: Daniel Bernal, Arm

DevOps Challenges SOAFEE is Addressing





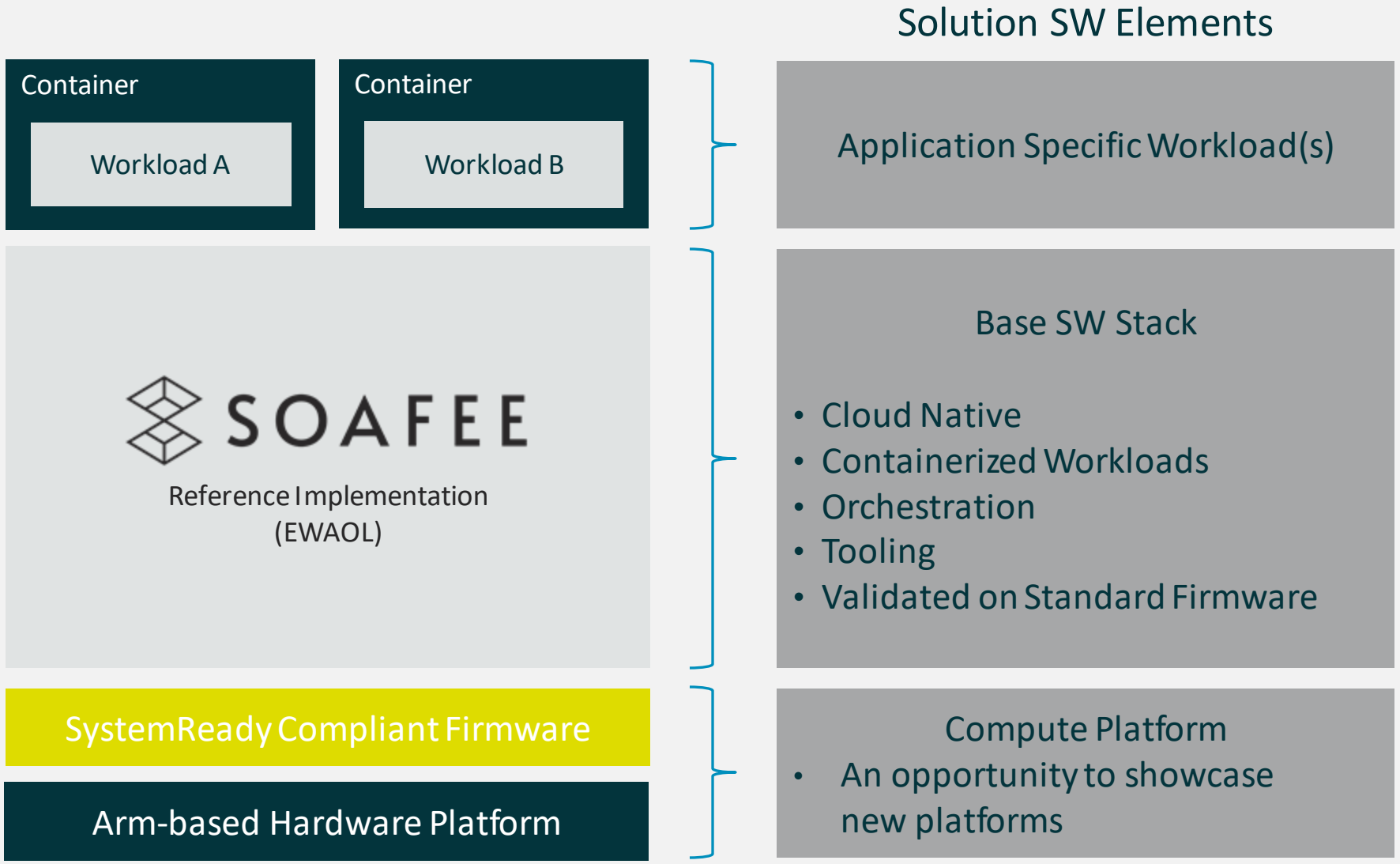
SOAFEE SIG Cloud-Native Infrastructure Vision – Project Eagle



SOAFEE Blueprints

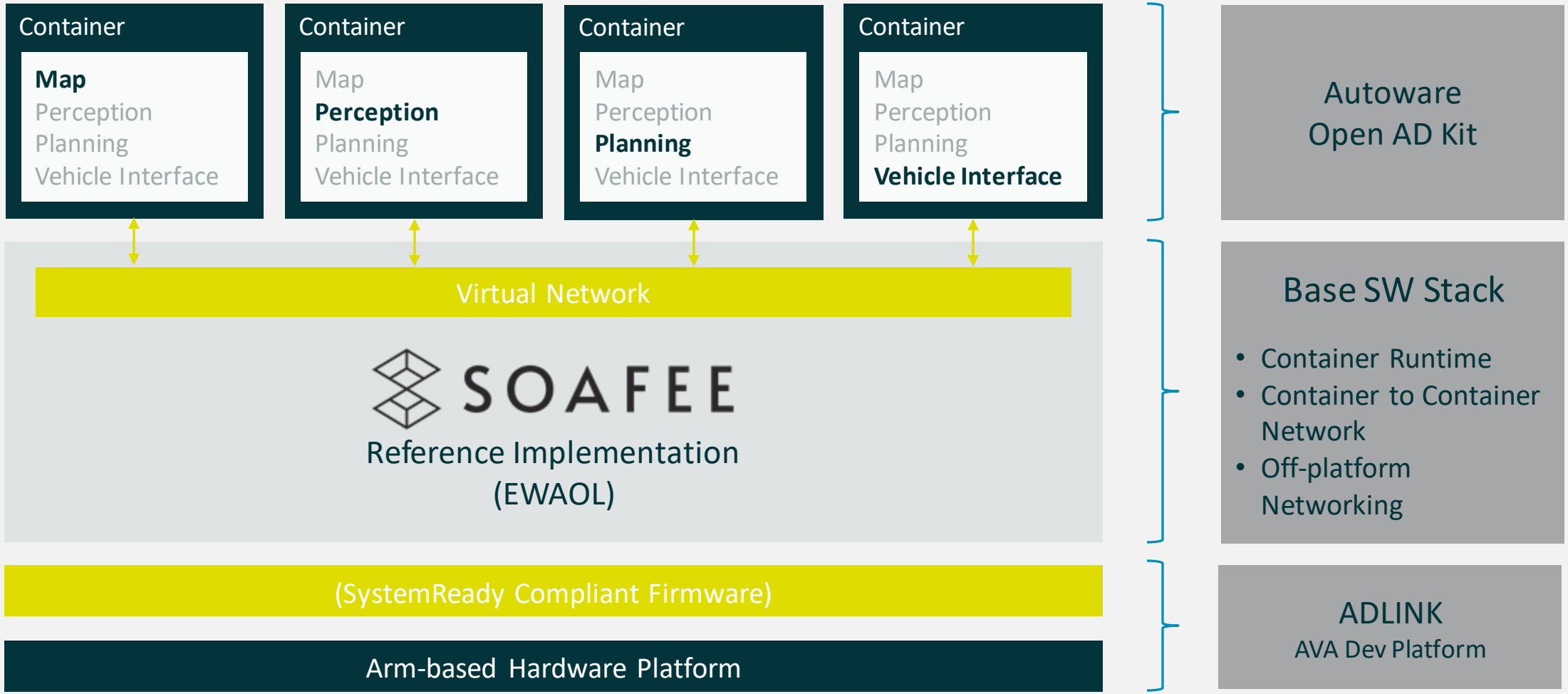
- A SOAFEE Blueprint is a reference application full-stack software solution that
  is guided by an automotive software defined use-case used to validate SOAFEE architectural concepts. The Blueprint application can be open source and would
  be provided as part of the Blueprint referenced source repository. Blueprint applications may also be delivered in binary form in an application container.
- SOAFEE Blueprint examples include:
  - Autonomous Driving Software Blueprint
  - IVI Blueprint
  - Connected car and security Blueprint

SOAFEE Blueprint



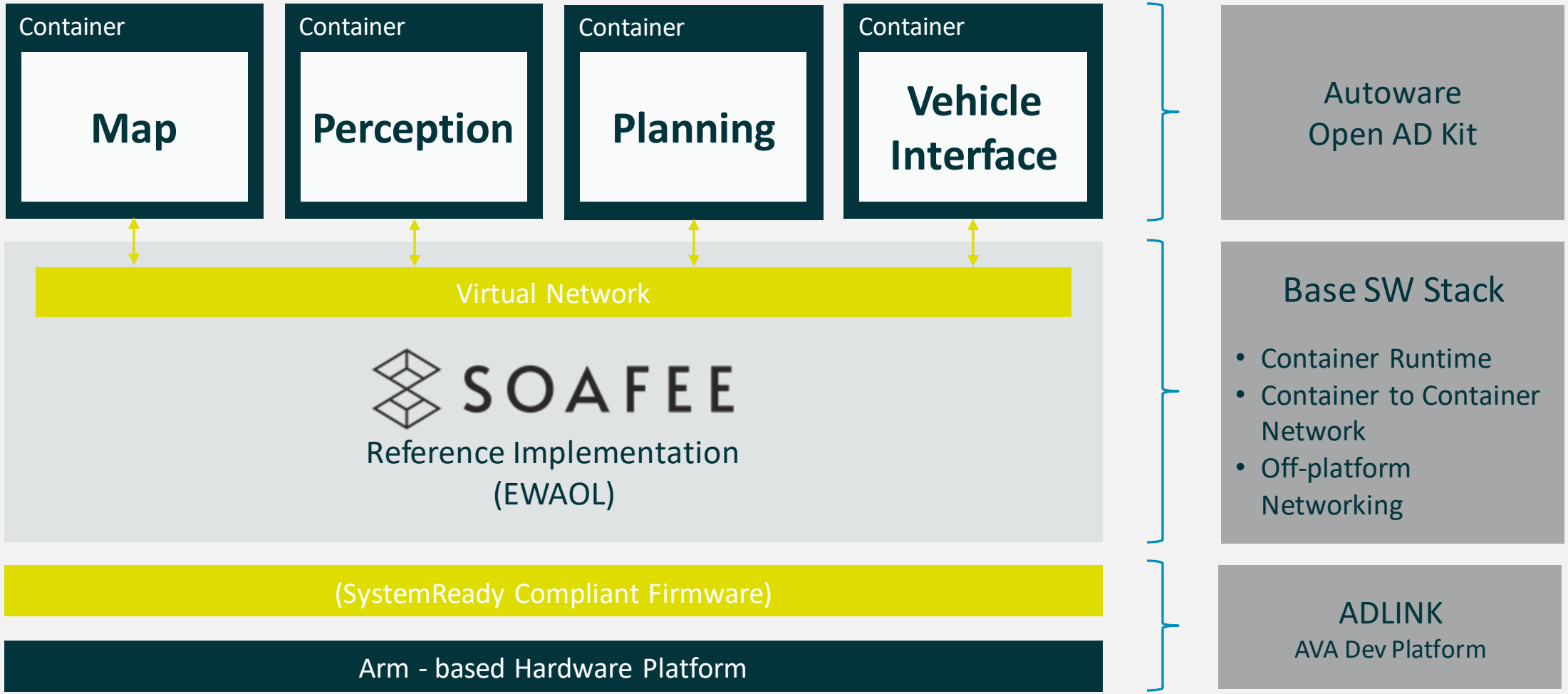
SOAFEE – Autoware OpenAD Kit Blueprint

Initial Blueprint Architecture



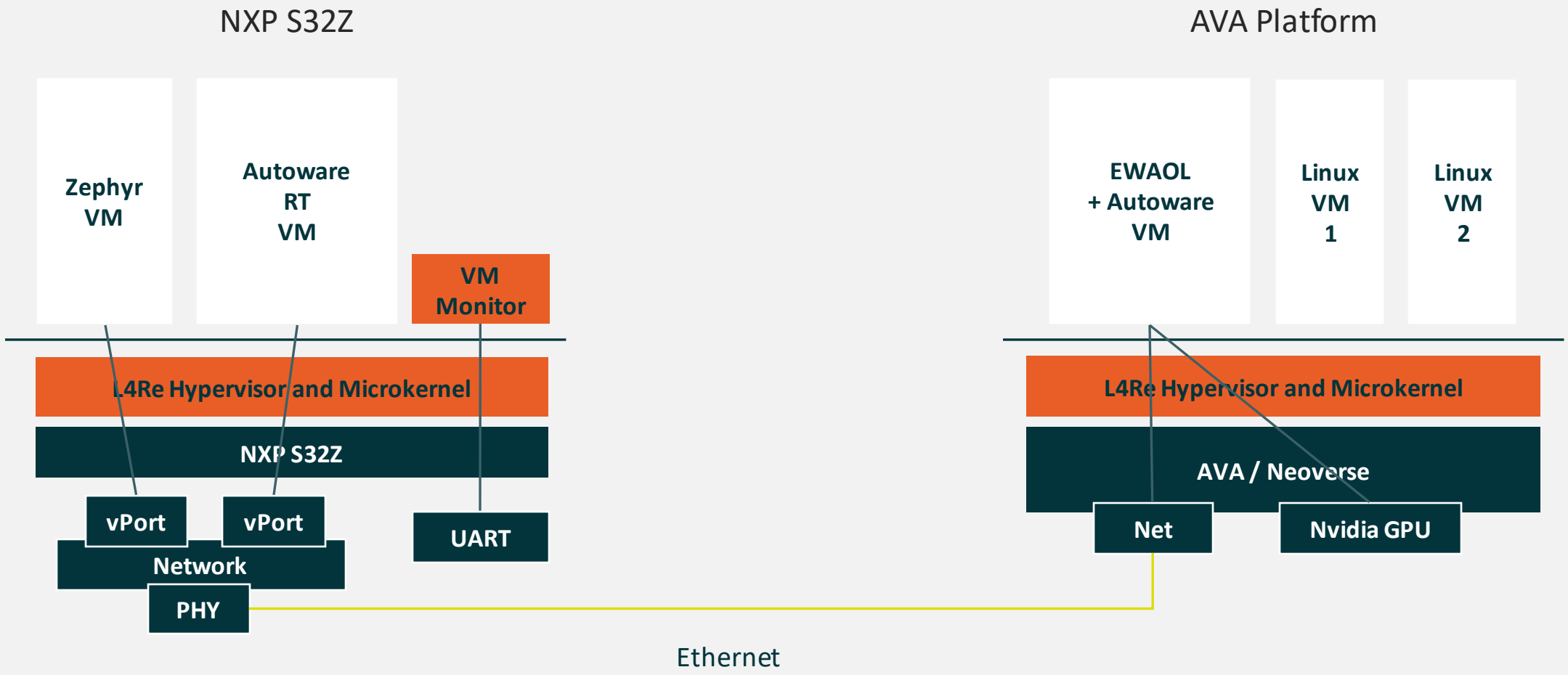
SOAFEE – Autoware OpenAD Kit Blueprint

V2 architecture



SOAFEE – Autoware OpenAD Kit Blueprint

Introducing A Safety MCU



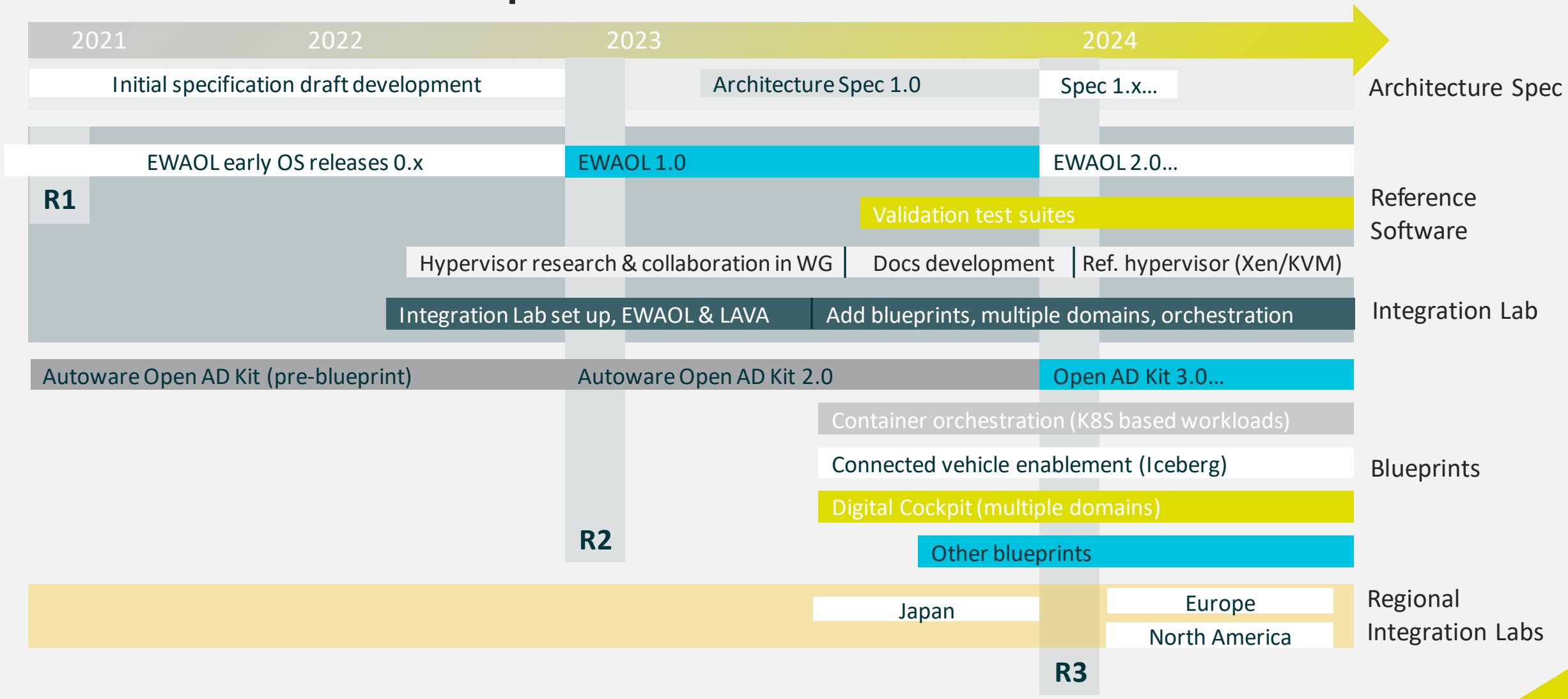
SOAFEE Blueprint Status

17 August 2023

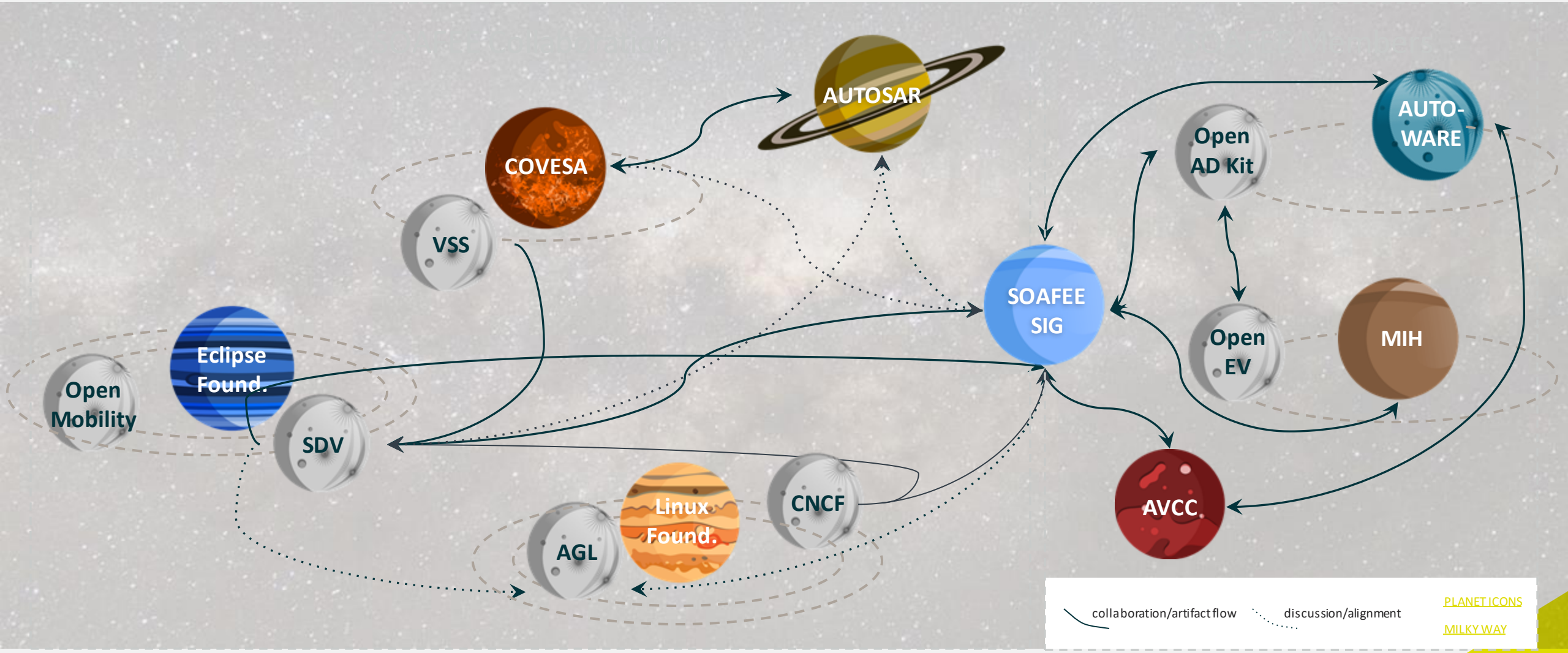
Blueprint	Description	Status	Repo
Autoware OpenAD Kit	Open-source autonomous drive software stack deployed as microservices.	R1 – 22 October, Submitted by Arm	https://gitlab.com/soafee/blueprints/-/tree/main/autoware_open_ad_kit_blueprint
K8S Based Workloads	Use Kubernetes Pod YAML files as input to orchestrate and run containers in a Soafee compliant Operating System.	Submitted by Leonardo Rosetti, Red Hat	merge request. Looking for early feedback
Iceberg	Connected Vehicle Enablement - Example solution used to manage the edge devices using AWS cloud.	Submitted by Andy Shahbazian, Amazon	Awaiting AWS status.
Digital Cockpit w/Safety Relevant Workloads	Digital Cockpit Blueprint showcasing a safety-relevant domain alongside non-safety relevant domain.	Daniel Bernal, Arm - M1 - Sandbox created using AVA Dev Platform	Pending some upstream work
Edge Orchestration Standardization Blueprints			
AosEdge Orchestration Platform	End-to-end (cloud & edge) platform for orchestration of containers, unikernels and firmware on SOAFEE-compliant hardware.	• Alex Agizim, Artem Mygaiev, EPAM • Hisao Munakata, Eugen Palnau, Renesas	
Piccolo, Edge Orchestrator	Edge orchestration solution supporting mixed-critical applications and resource controls	• Chulhee Lee, LGE	
Eclipse Ankaios	Multi-Node Orchestration API/Middleware for SDV	• Elektrobit	
K3S	Lightweight Kubernetes solution for Edge Devices.	A CNCF Sandbox project	
Red Hat Edge Orchestrator (MicroShift)	MicroShift - Optimizing OpenShift and Kubernetes for the Edge	• Red Hat	
Backlog (In the works…)			
Eclipse Chariott on MS Azure	Cabin Monitoring service running on Chariott middleware with cloud and local execution locality.	Benjamin Mordaunt, Arm	
SDV Development on Virtual Hardware	Example workflow demonstrating "DevOps in Cloud" testing the virtual hardware, "Deploy at the Edge" with real hardware.	Sandeep Pendharkar, Vayavya Labs	
Automotive System Simulation	Automotive System Simulation on PAVE360 Platform	Unmesh Dutta Bordoloi, Siemens	
Secure Data Storage	Secure Data Storage example using Mimer Trust (TEE/TA)	Fredrik Malmstrom, Mimer - New SOAFEE member	
EWAOL on CAEdge	Example application showcasing Continental CAEdge platform	Elektrobit	
RTI DDS	DDS Application example using EWAOL	Pedro Lopez, RTI	

SOAFEE

SOAFEE Roadmap

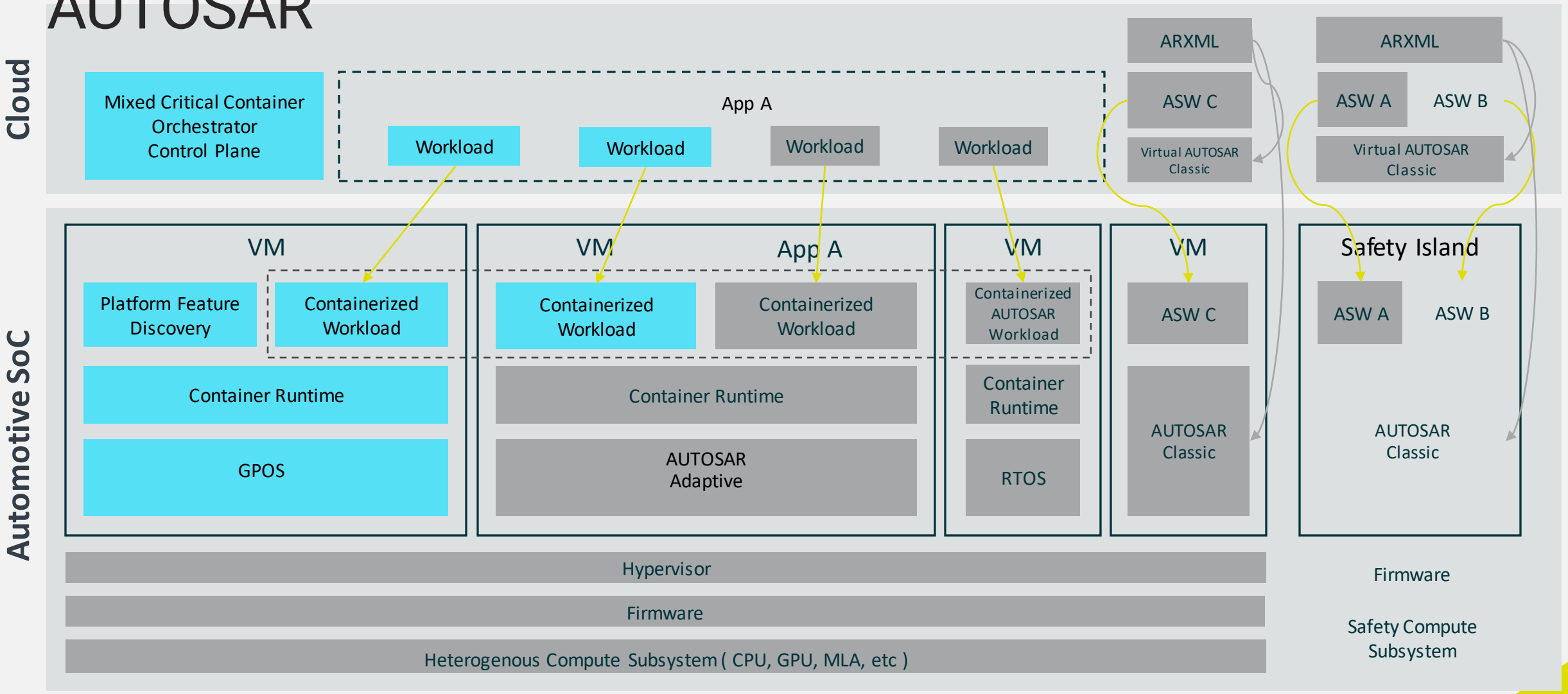


Map of Automotive Software Initiatives



No claim of completeness – this is just an excerpt for illustration purposes

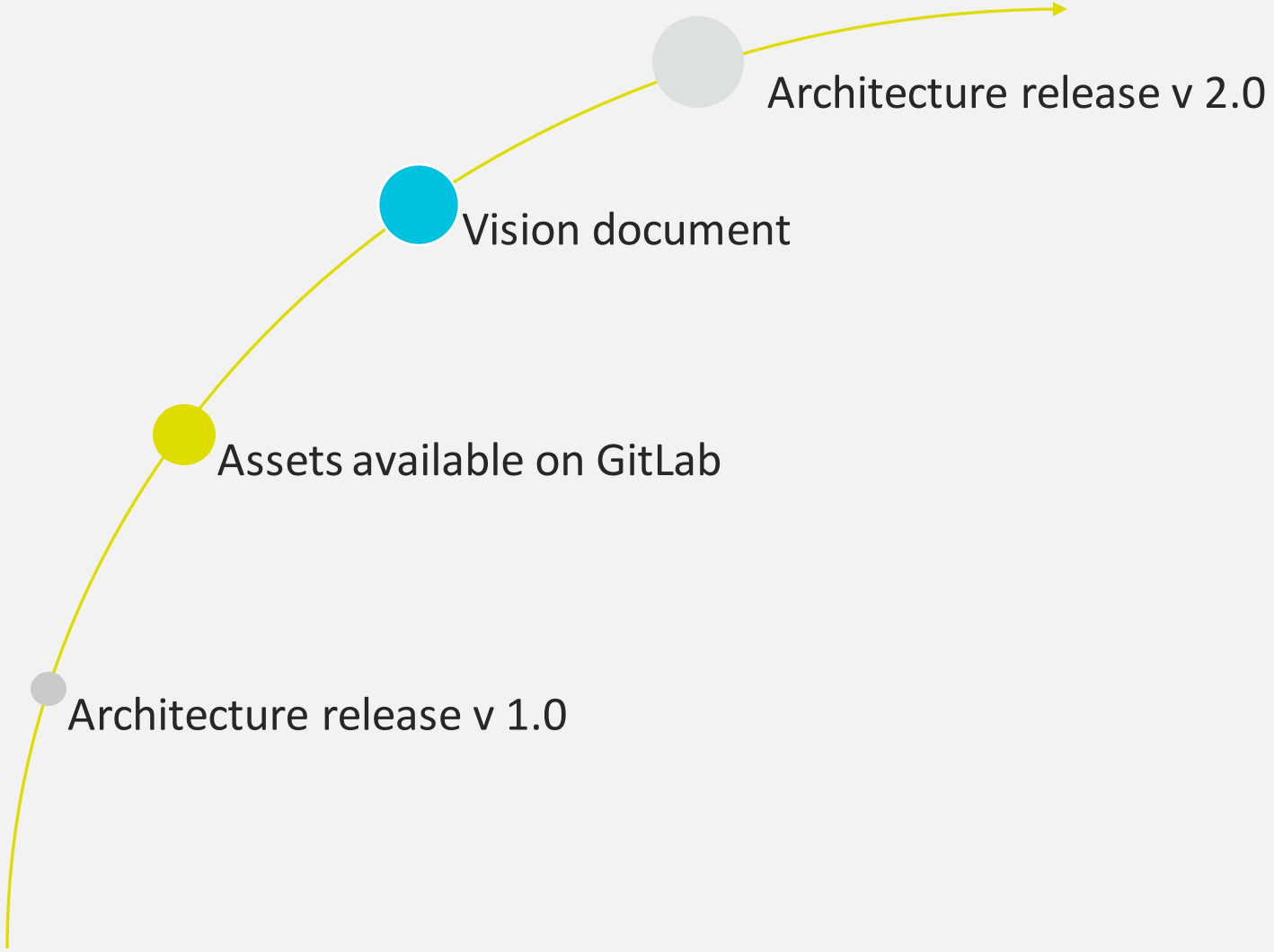
Example : Mixed Critical Workloads – Integration with AUTOSAR



SOAFEE Working Groups

- → Working groups have been streamlined to enable them to be more effective
  - Cloud-Native Development and Cloud-Native Tools Working Groups have been merged
  - There was a huge overlap in technology areas, so we made the decision to remove the duplication
- → We have created a new Hypervisor Working Group
  - Hosted by Francois Ozog
  - He pulls in expertise from across the ecosystem (including outside of the current SOAFEE membership)
  - Focus is on hypervisor portability through adoption of standards like SystemReady
- → MCO Tiger Team will use the requirements from the Open AD Kit blueprint for mixed critical orchestration to implement within SOAFEE architecture, framework and reference implementation for Open AD Kit 3.0

SOAFEE Architecture Journey



Architecture assets available being picked up and widely used for integration labs

Imminent release of vision and next stage platform

SOAFEE Integration Labs

Linaro Lab

- Uses GitLab
- Nightly EWAOL builds

AVA Platform

- Real hardware validation
- Concept extension Q2 in 2023

Compliance Test Suite

- 3rd party test execution
- Possible feed into certification toolset

Remote Hub/Spoke Labs

- Red Hat IVOS validation
- Extend to other hardware/ software platforms

Blueprints

- Ongoing development
- Seeking additional interested partners

“Regional” integration labs

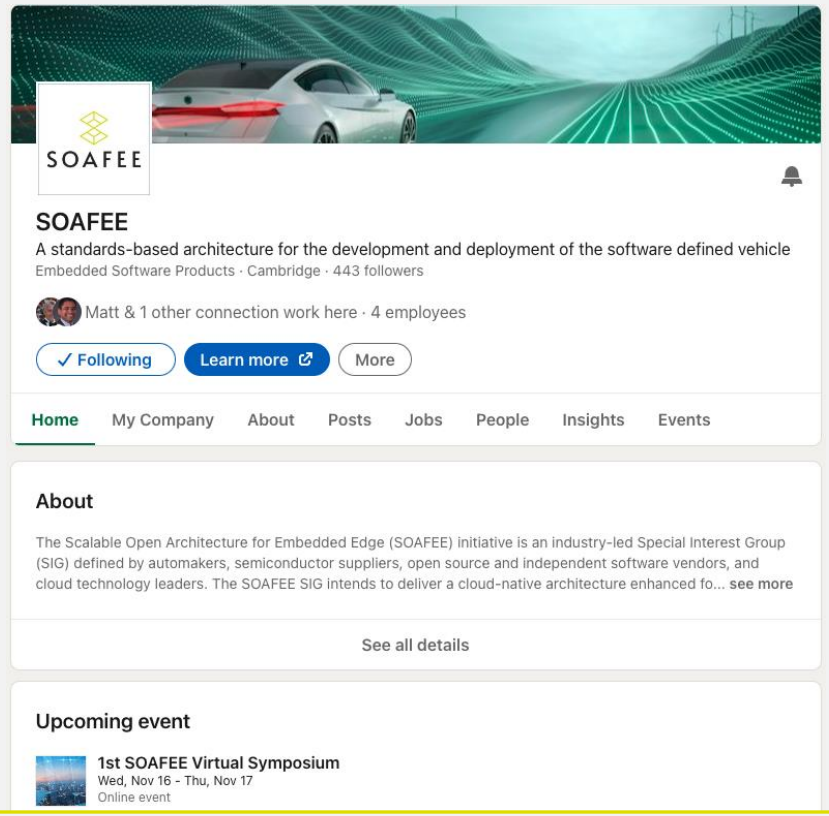
- Have an idea to meet regional requirements using the blueprint program
- Regional SOAFEE members can collaborate to take existing blueprints and port them to regional relevant underlying software stack, middleware and hardware platforms
- Initial RIL will be hosted in Japan and use the Open AD Kit Blueprint

How to Get Involved

Participating and Contributing to SOAFEE

- → Learn (more) about SOAFEE
  - Browse documents section at soafee.io
- → Use the SOAFEE slack channel
- → Download SOAFEE reference integration and implement it in your system
- → Follow SOAFEE on LinkedIn
- → Consider joining SOAFEE SIG
  - Contributing member
    - → No agreement required
  - Voting member
    - → Sign membership agreement

Contact robert.day@arm.com for more information on becoming a member



Thank You
Danke
Gracias
Grazie
谢谢
ありがとう
Asante
Merci
감사합니다
धन्यवाद
Kiitos
شكرًا
ধন্যবাদ
תודה