

arm

# Cloud native and its role in Automotive



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# Who am I

- Senior Software Architect in Arm's Automotive and IoT Business Line
- Responsible for a portable Software Architecture for Automotive and IoT solutions
- Embedded software engineer for over 20 years
- Open Source enthusiast
- Love rugby where I coach a local boys team, am a qualified society referee and still play touch rugby



# What is Cloud-Native

Ask 10 people and you will get 10 different answers

The official definition from the CNCF project charter

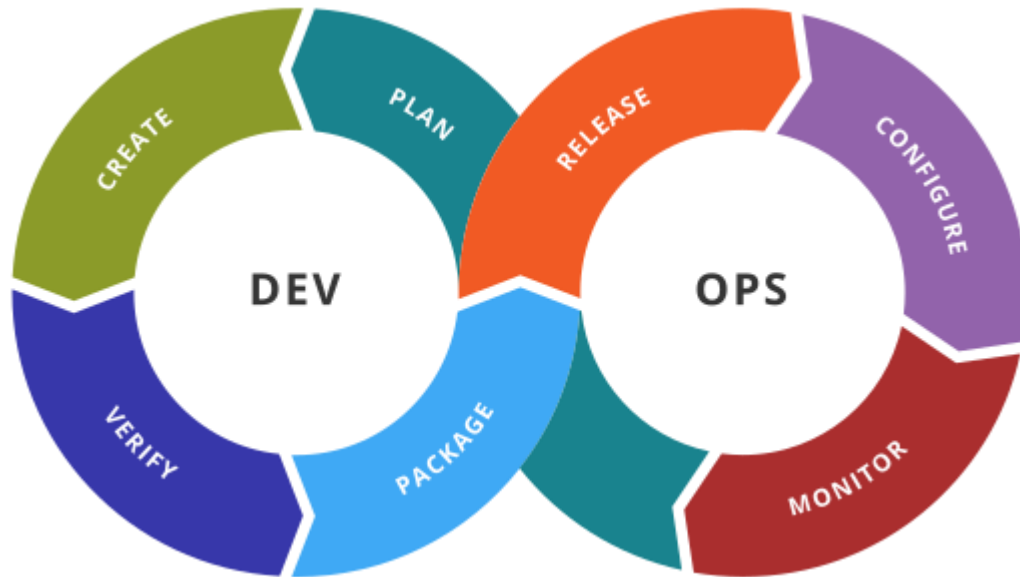
<https://github.com/cncf/foundation/blob/master/charter.md>

Cloud-native technologies empower organizations to build and run scalable applications in modern, dynamic environments such as public, private, and hybrid clouds. Containers, service meshes, microservices, immutable infrastructure, and declarative APIs exemplify this approach.

These techniques enable loosely coupled systems that are **resilient, manageable, and observable**. Combined with robust **automation**, they allow engineers to make **high-impact changes frequently and predictably with minimal toil**.

# What is Cloud-Native

Encourages strict development practices



<https://commons.wikimedia.org/wiki/File:Devops-toolchain.svg>

Focus on Standards

- OCI (Open Container Initiative)
  - Container runtime and image specification
- CNCF (Cloud Native Compute Foundation)
  - CRI – Container Runtime Interface
  - CNI – Container Networking Interface
  - CSI – Container Storage Interface
  - Parsec – Container Security Services
  - ... many more ...

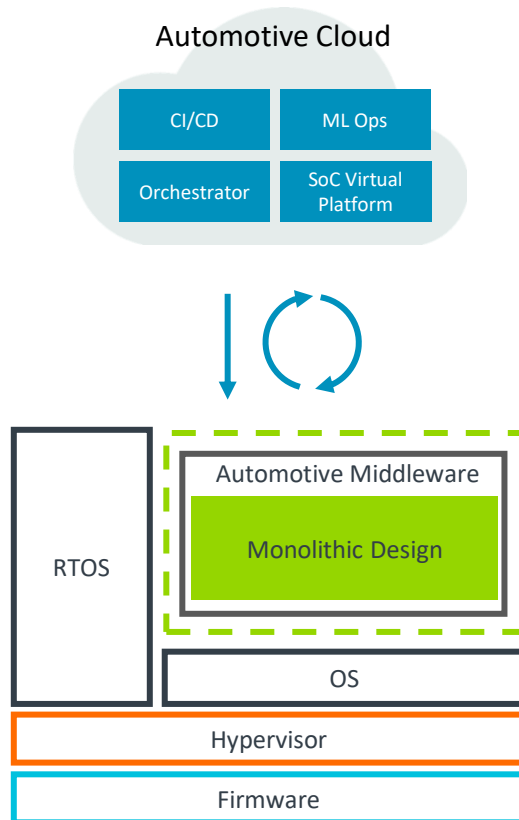
Broad adoption of these standards helps deliver the DevOps vision whilst enabling a vibrant tools ecosystem delivering high quality software solutions

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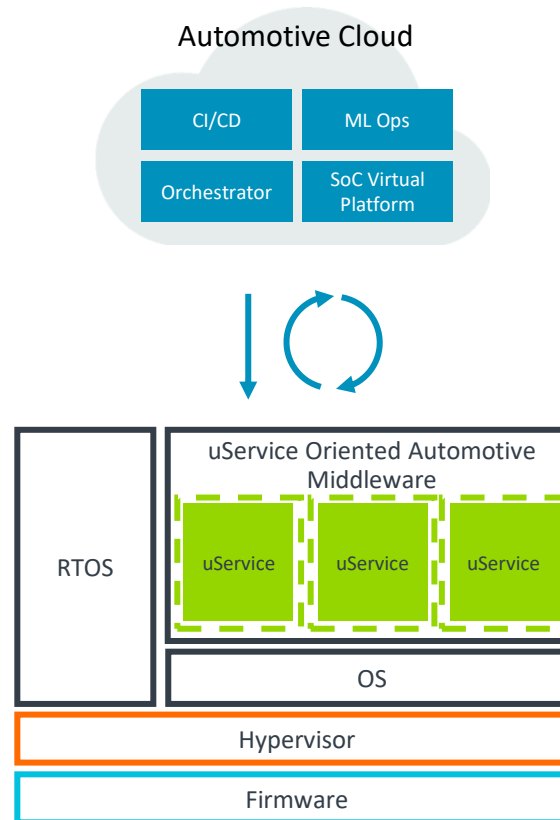
# Market Trends towards Cloud Native


# Cloud-Native Is Key Enabler for Software Defined Vehicle

Service-Oriented Architecture Based Automotive Stack

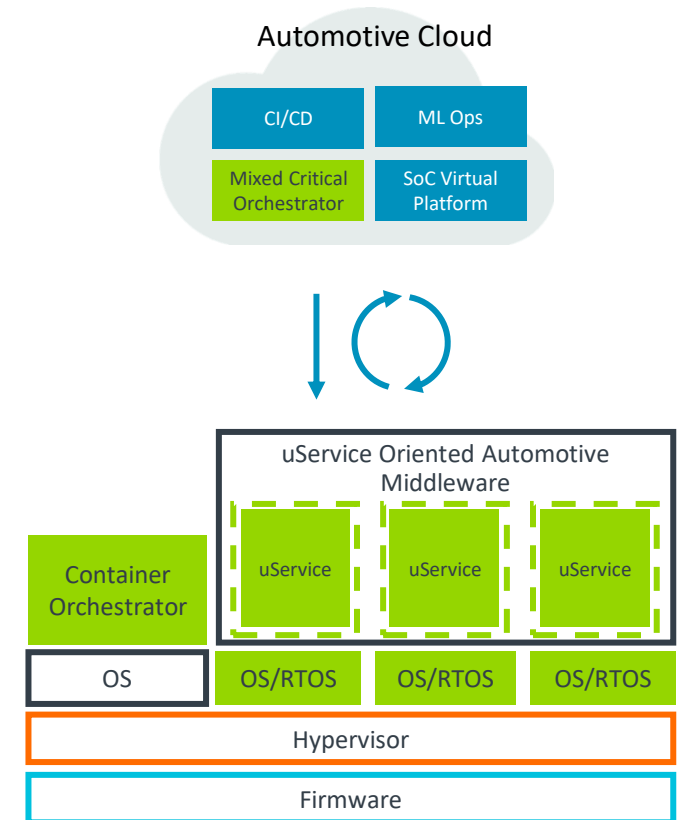


Microservices Based Automotive Stack



 = Containers

Microservices Based Automotive Stack With Mixed Criticality Orchestrator



# But the SW-Defined Car Faces Some Critical Challenges



Requiring a Seamless Continuum From Development to Deployment

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# Introducing SOAFEE

Scalable Open Architecture For Embedded Edge

<http://soafee.io>



# Introducing SOAFEE

## **Initiative to enable cloud native software experience across Arm's embedded edge ecosystem**

Based on Project Cassini and System Ready and extended to cloud native mixed critical workload development

## **Open standards for cloud native embedded edge**

Open forum and Special Interest Group to adopt and extend standards for cloud native mixed critical SW development

## **Open-source reference software stack**

Reference software stack for development and ecosystem seeding to enable path from development to commercial deployment

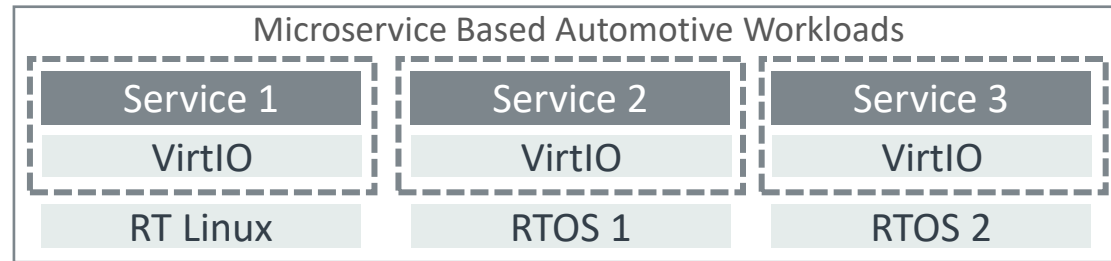


S O A F E E

# SOAFEE Cloud Native Architecture

Mixed Commercial and Open-Source Technologies

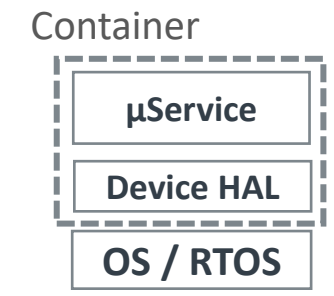
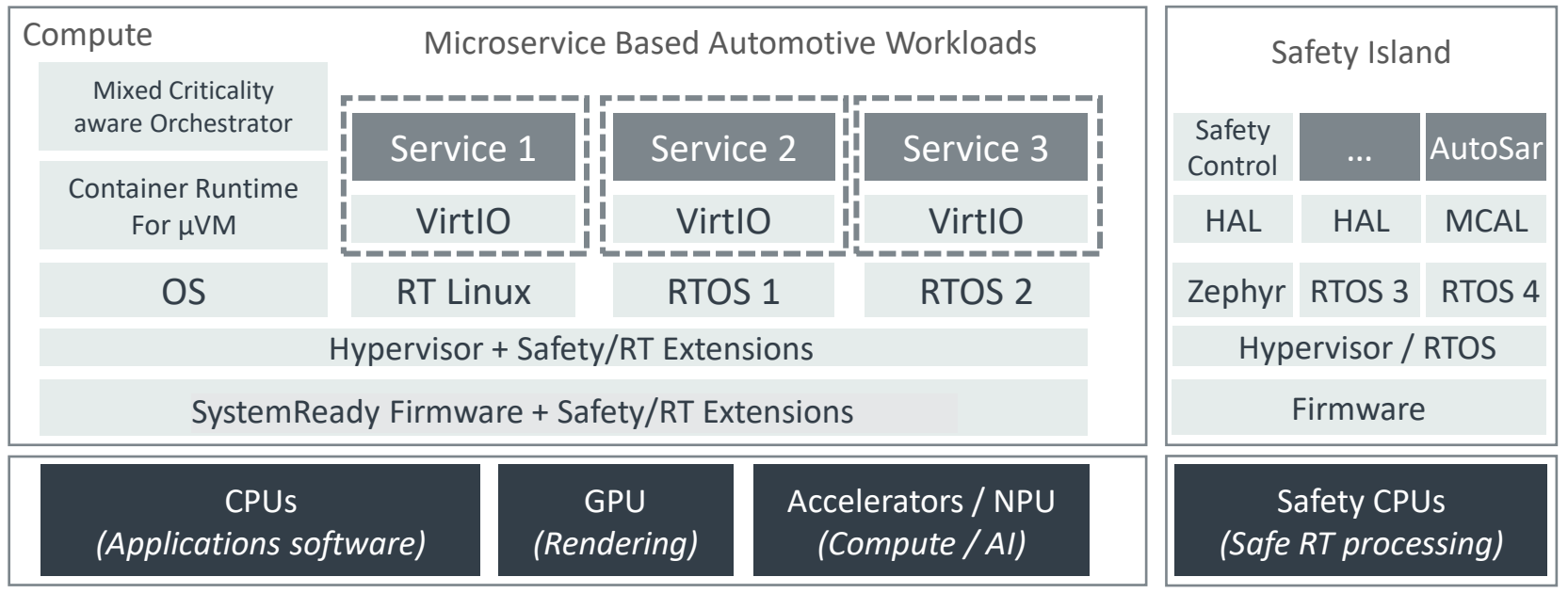
## Cloud Service Providers



Open-Source or Commercial applications benefiting from SOAFEE Architecture

Open-source or commercial technologies influenced by SOAFEE Architecture

## Arm SoC

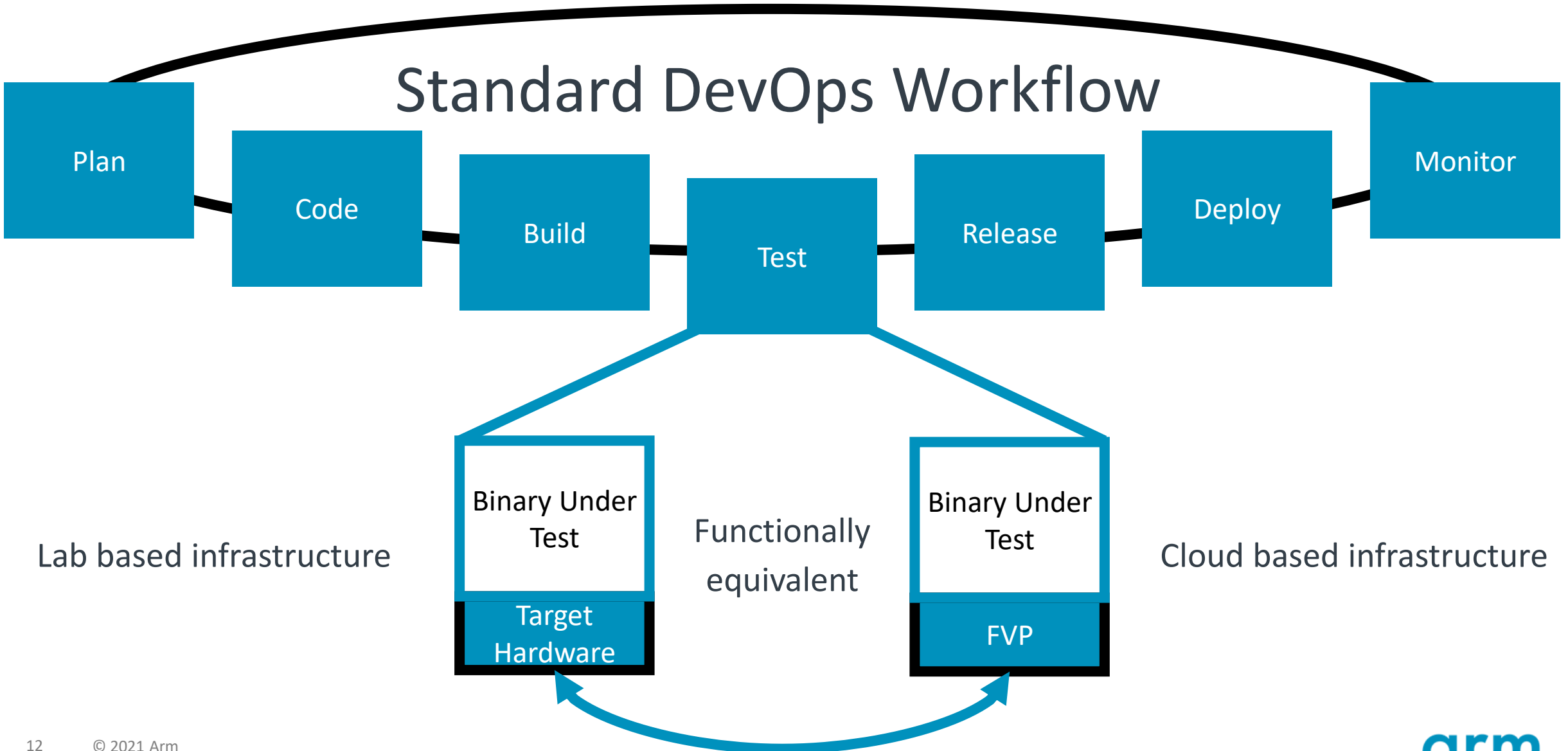


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Tooling integration

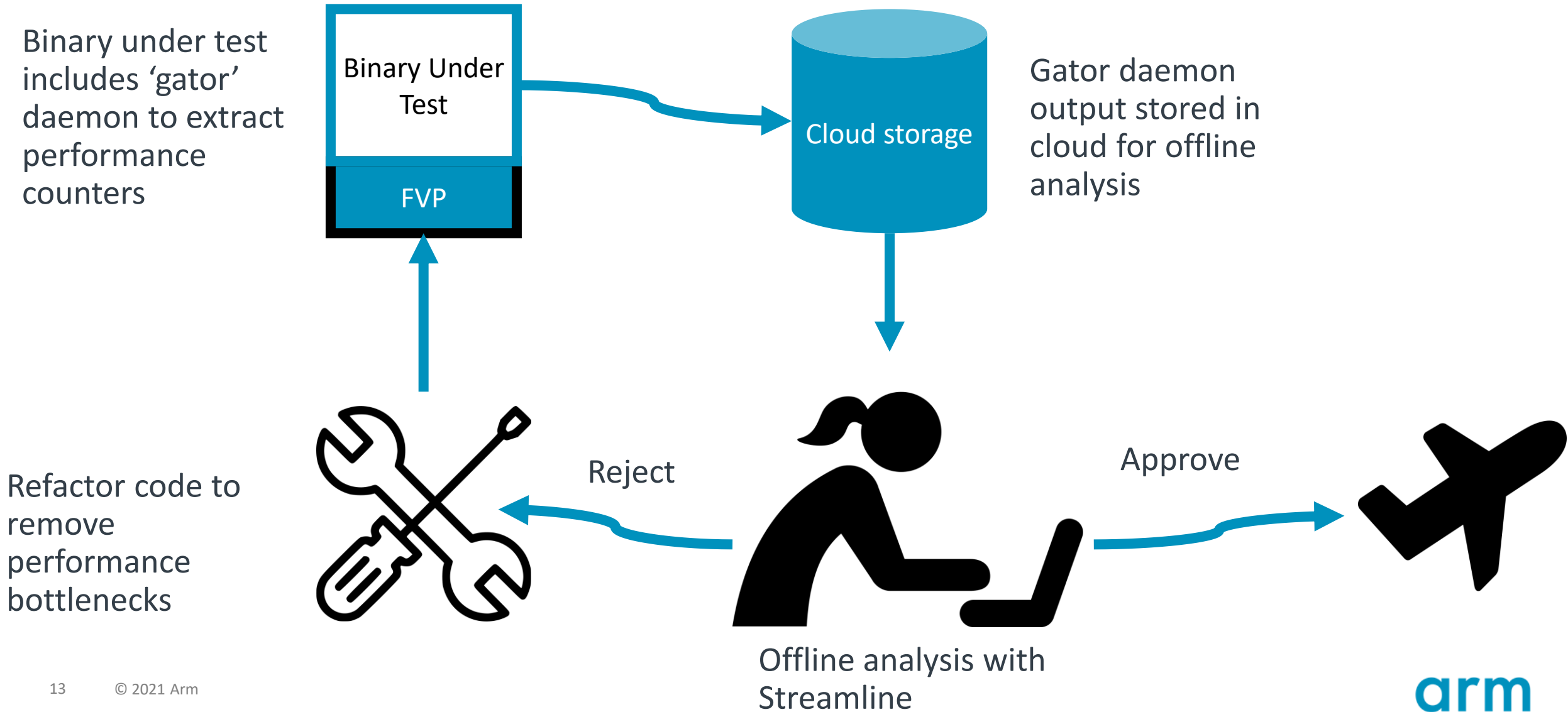
# Edge Testing with Cloud Based FVP

## Standard DevOps Workflow





# Streamline validation in the cloud



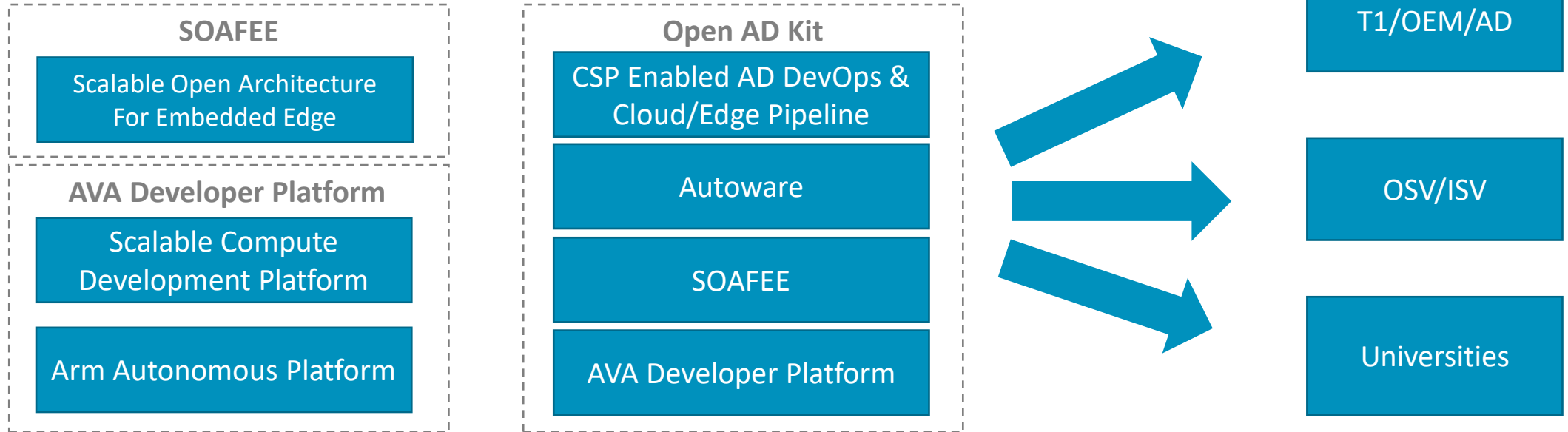
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Use-cases

# Autoware Foundation Open AD Kit



Cloud to edge Autonomous Reference Dev Kit

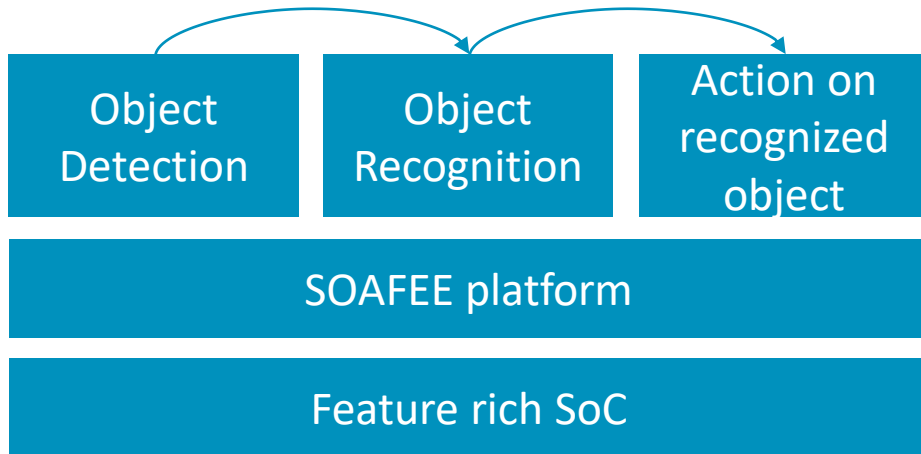


60+ Organizations

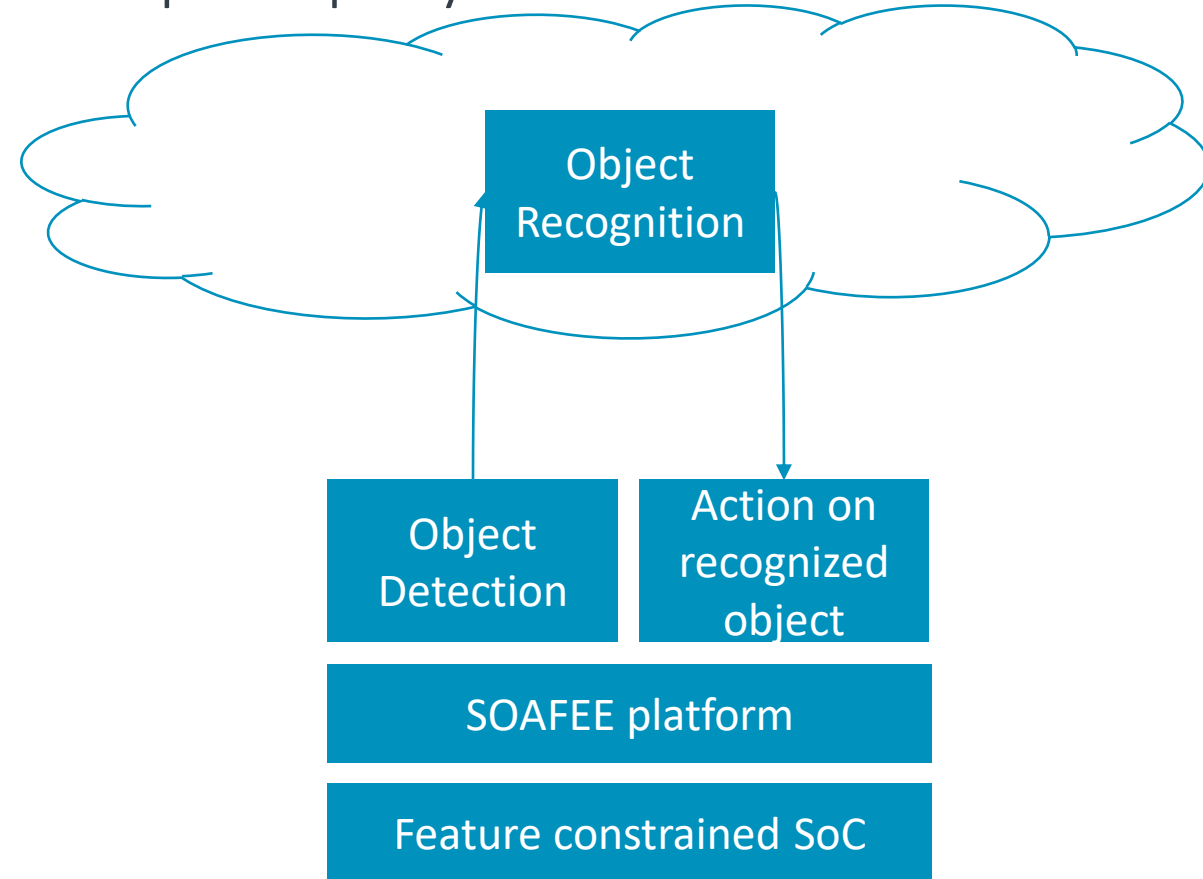


# Intelligent Workload Migration

On platforms that have the processing capability, the composed workloads can be deployed to the edge node



Compute intensive containers can migrate to the cloud when edge devices don't have the compute capacity for that workload





# Conclusion

- The move to Cloud-Native is happening in areas outside of Infrastructure
- Arm and our partners are working closely to solve domain specific issues with adoption of Cloud-Native technologies
- Through the adoption of SOAFEE and enhancement to DevOps best practices along with Cloud-Native standards, our software defined future will be...

More Secure

Quicker to Market

Maximise Reuse

Safer

Reduce Cost

Higher Quality

Easier to Maintain

And much, much more...

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Thank You

Danke

Gracias

谢谢

ありがとう

Asante

Merci

감사합니다

धन्यवाद

Kiitos

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