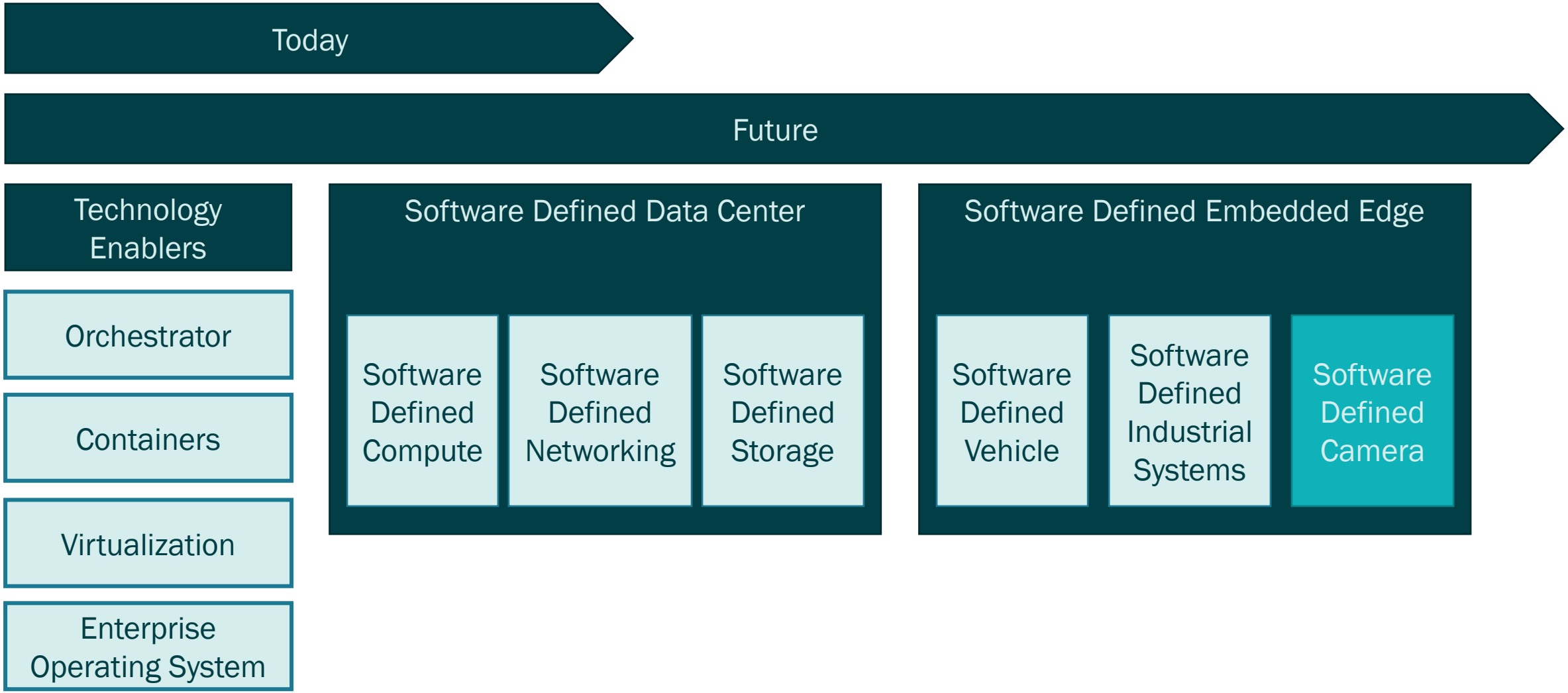
Software Defined Cameras for Edge Computing of the future

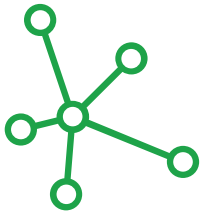
Parag Beeraka
Head of Smart Camera and Vision Business
Arm

arm

“Software Defined” – The Trend



Transformation of Computer Vision and Camera Products Underpinned by 3 Key Trends



Shift to Edge Compute

AI-enabled intelligent cameras

Increased Security Focus

Resilient and secure deployments

Cloud Native

Run cloud-native applications and deploy services over time

Shift to Edge Compute

Location and Tracking

- Identify people and other objects
- Track direction and motion to predict location
- Enable hotspot detection

Automatic Boundaries

- Create boundary conditions quickly with Image Segmentation

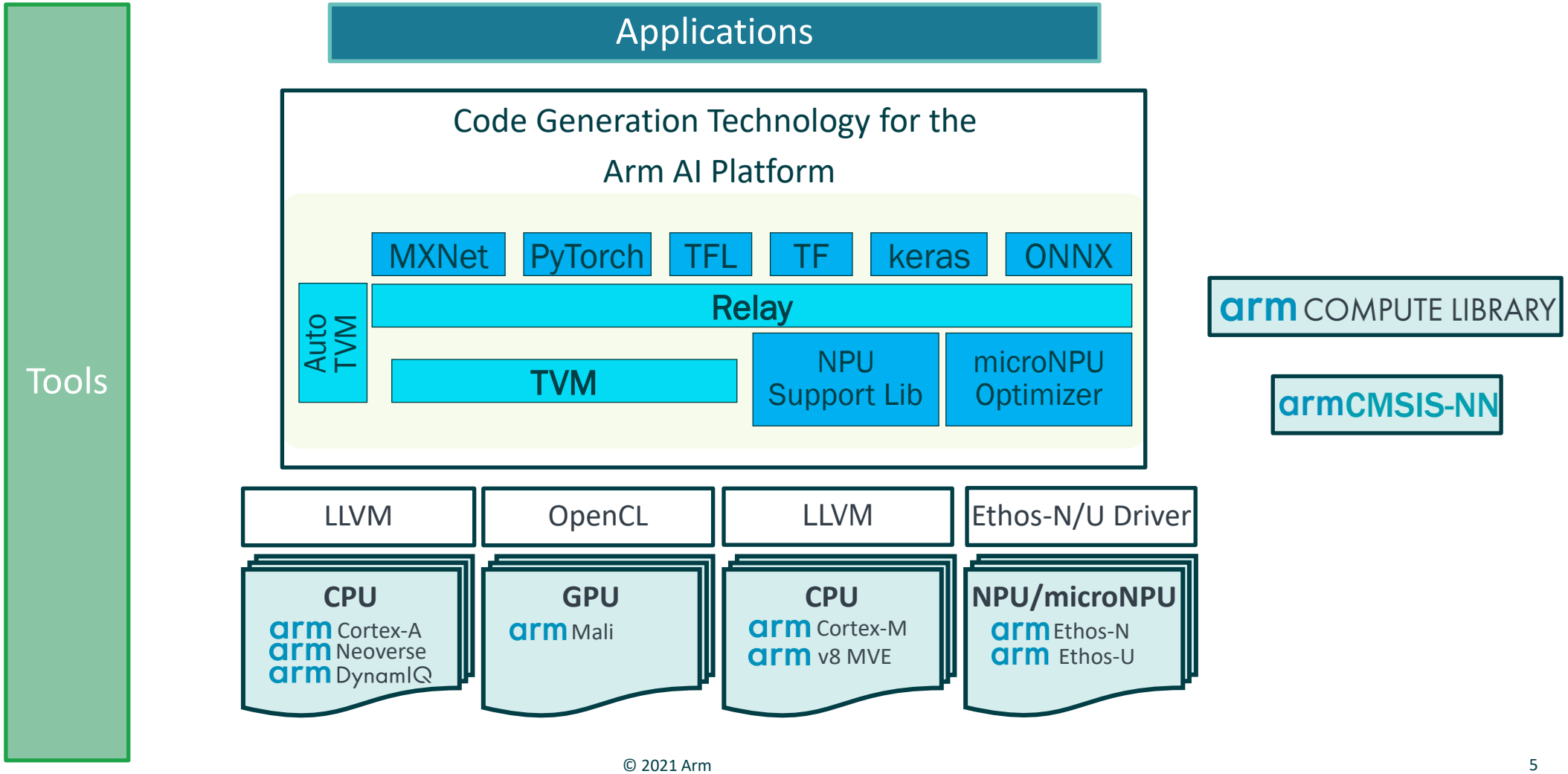
Smart and Secure

- Grant access onto property
- Privacy preserving with secure local inference
- Third party model/IP protection

Increasing Intelligence

- Estimate actions with pose estimation and understanding
- Ability to interact verbally with security system

The Arm AI Platform and Code Generation



Increased Security Focus

Root of Trust

End-End Security (Edge to Cloud)

Data Privacy

Secure Boot Trusted Firmware

Data Security

Secure Key Management

Requirements

Any Workload, Any Programming Language, Any Container Runtime, Any Packaging

PARSEC

Platform Abstraction for Security

Any Platform, Any Architecture, Any Hardware

Discrete Trusted Platform Module

Firmware Trusted Platform Module

Local Hardware Security Module

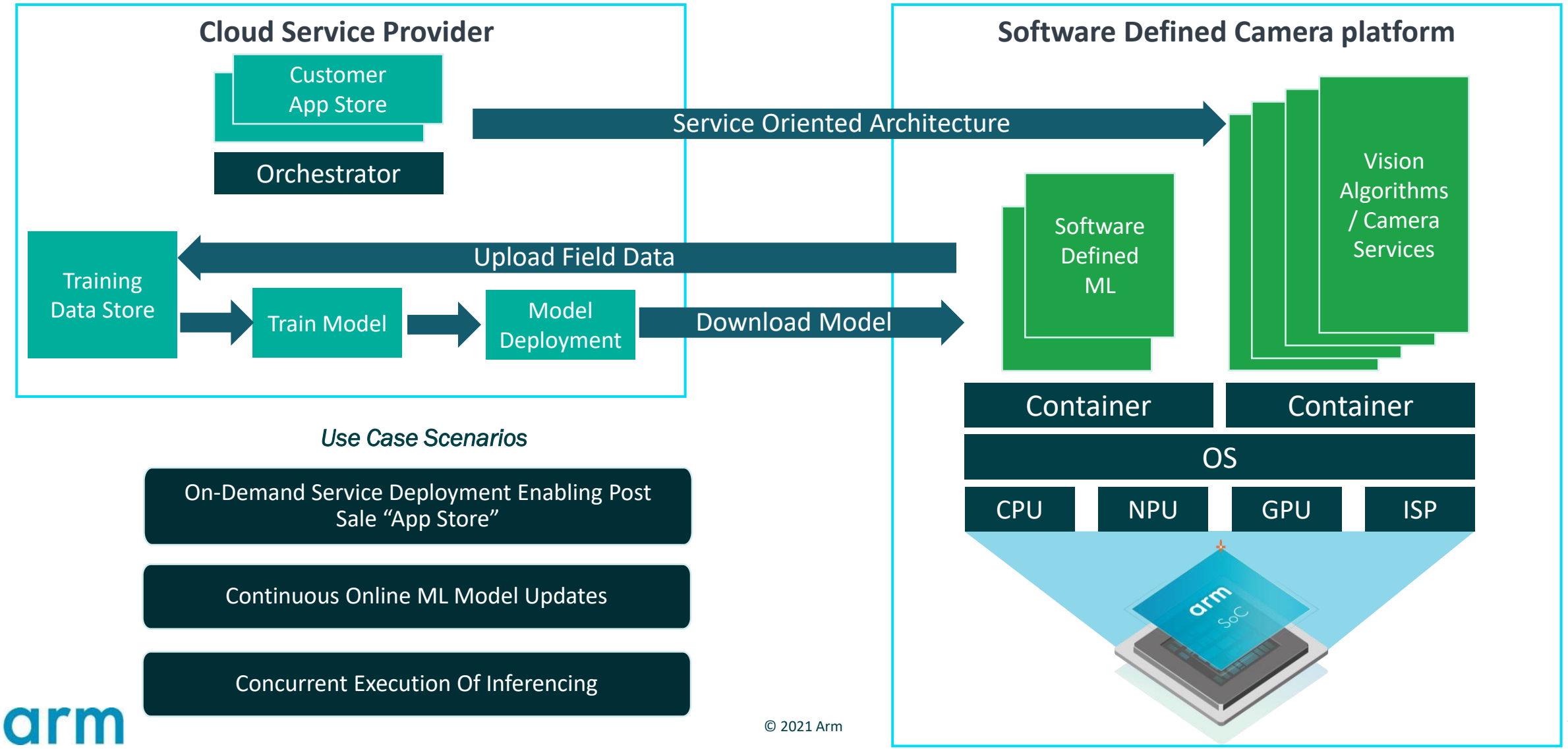
Remote Hardware Security Module

Trusted Apps

arm TRUSTZONE + psa certified™

Solution

Cloud Native Provides Camera and Vision Products with Machine Learning Capabilities

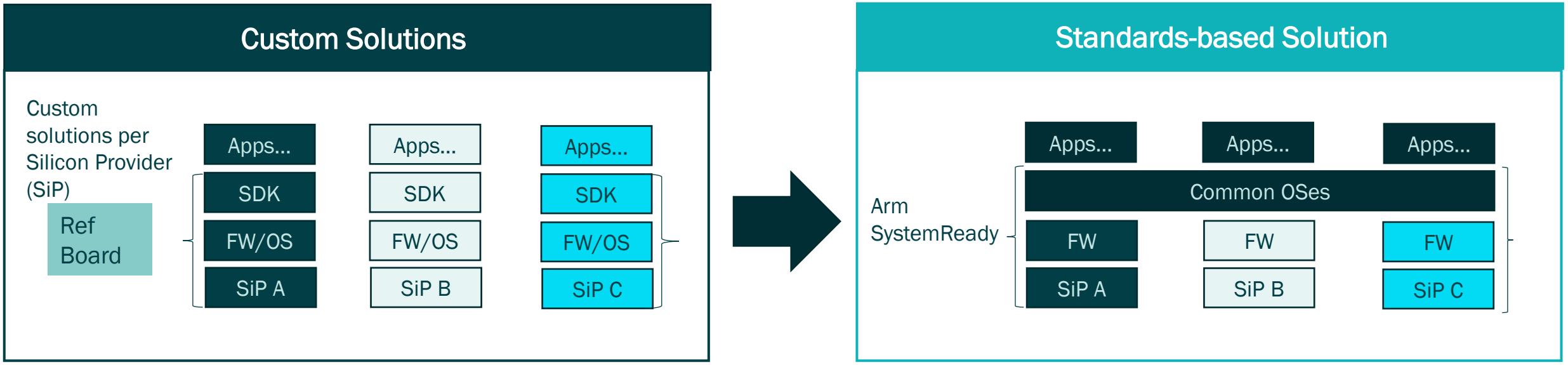


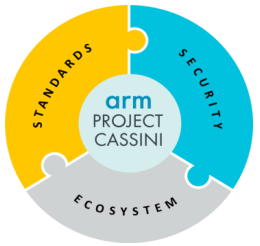
Use Case Scenarios

- On-Demand Service Deployment Enabling Post Sale "App Store"
- Continuous Online ML Model Updates
- Concurrent Execution Of Inferencing

Embrace a Standards-based Ecosystem

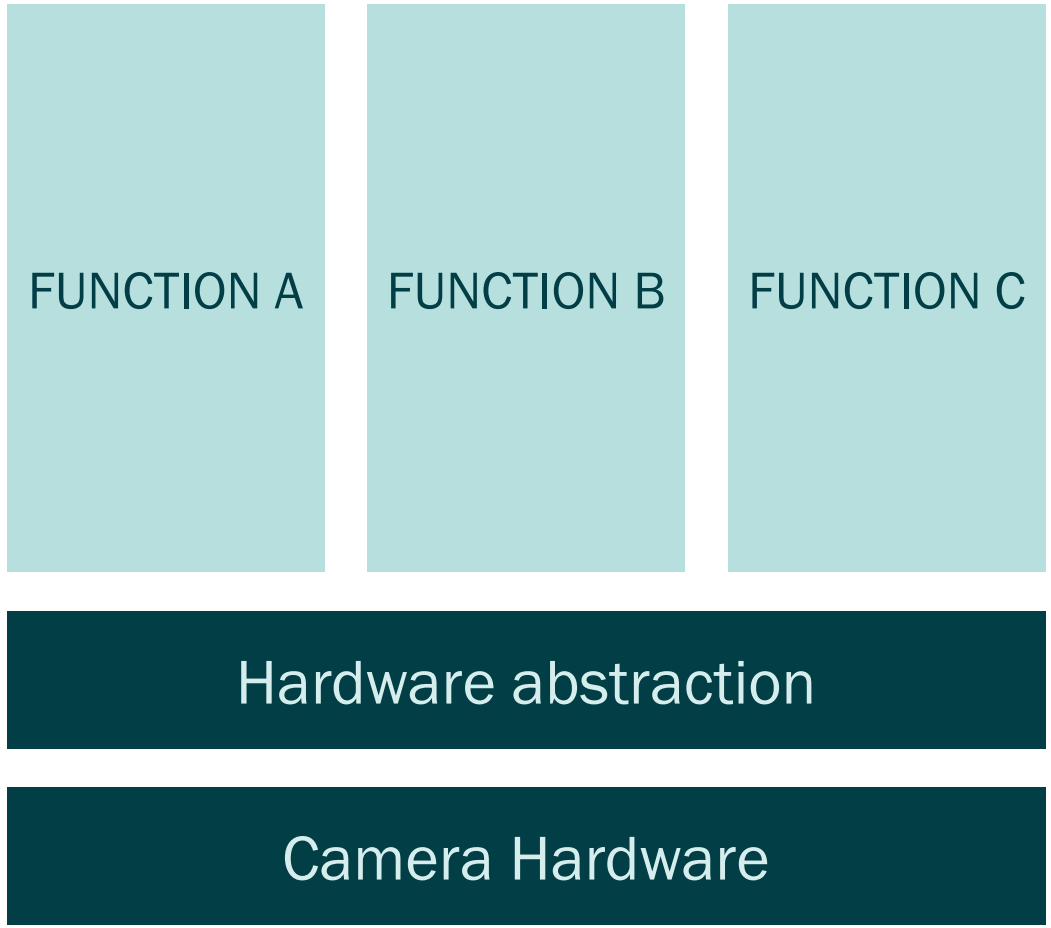
Arm is working with many ecosystem partners (OEMs, ODMs, silicon vendors) to drive a standards approach in order to scale deployments by replacing custom solutions with standards-based solutions and become the platform of choice for future camera deployments





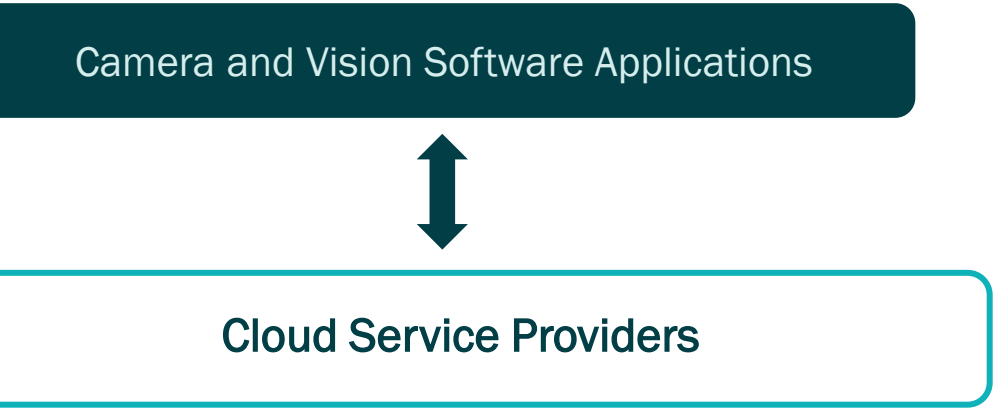
arm SystemReady

Cameras and Vision Products can be “Software Defined”

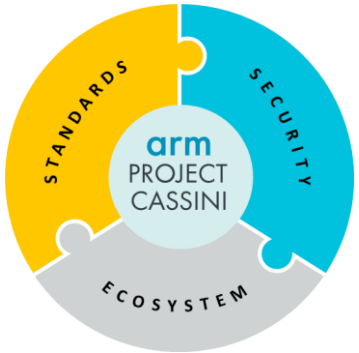


- Functions enabled by software are abstracted from hardware
- Functions enabled using cloud-native Service-Oriented Architecture (SOA) software development model:
  - ✓ Functions delivered as services are self-contained units of software
  - ✓ System for publishing available services to the camera
  - ✓ Centralized management of these services
- Ease of integration into Cloud Service Providers infrastructure
- Seamless software and machine learning development on the cloud and deployment at the edge

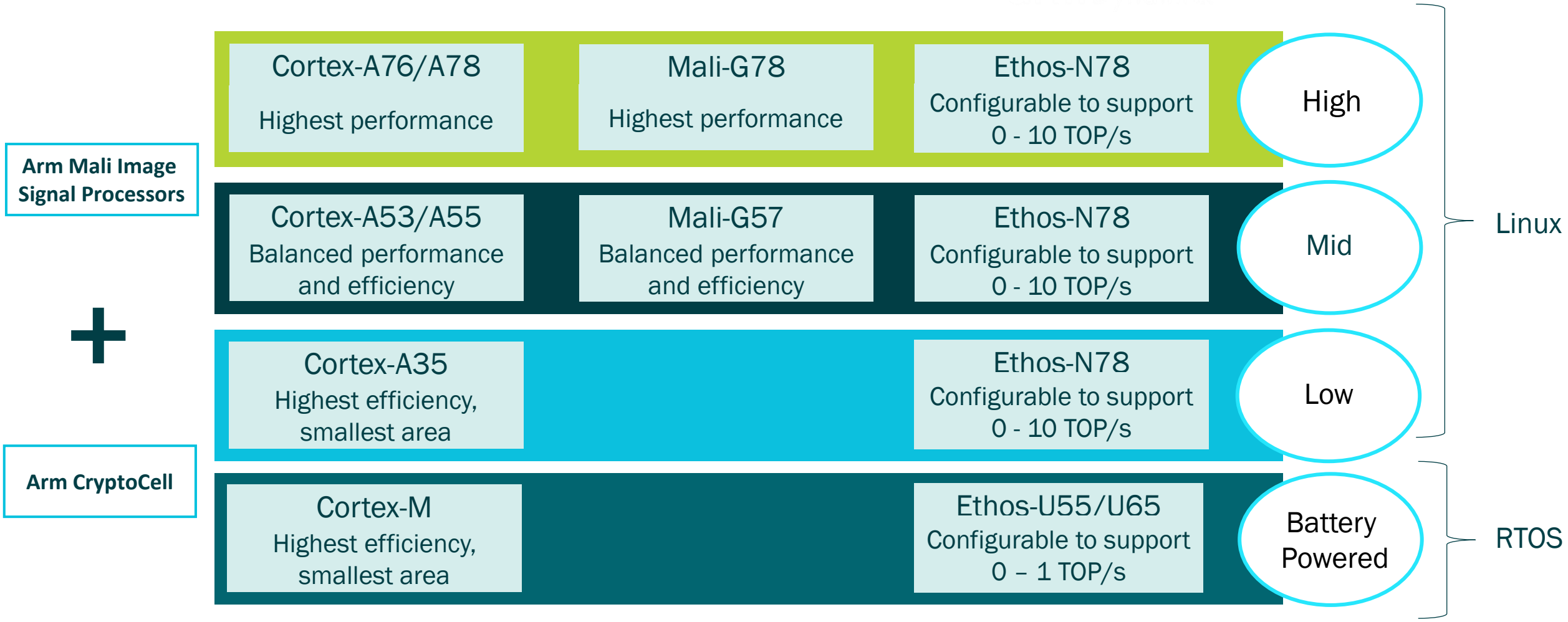
Software Defined Camera Architecture Proposal



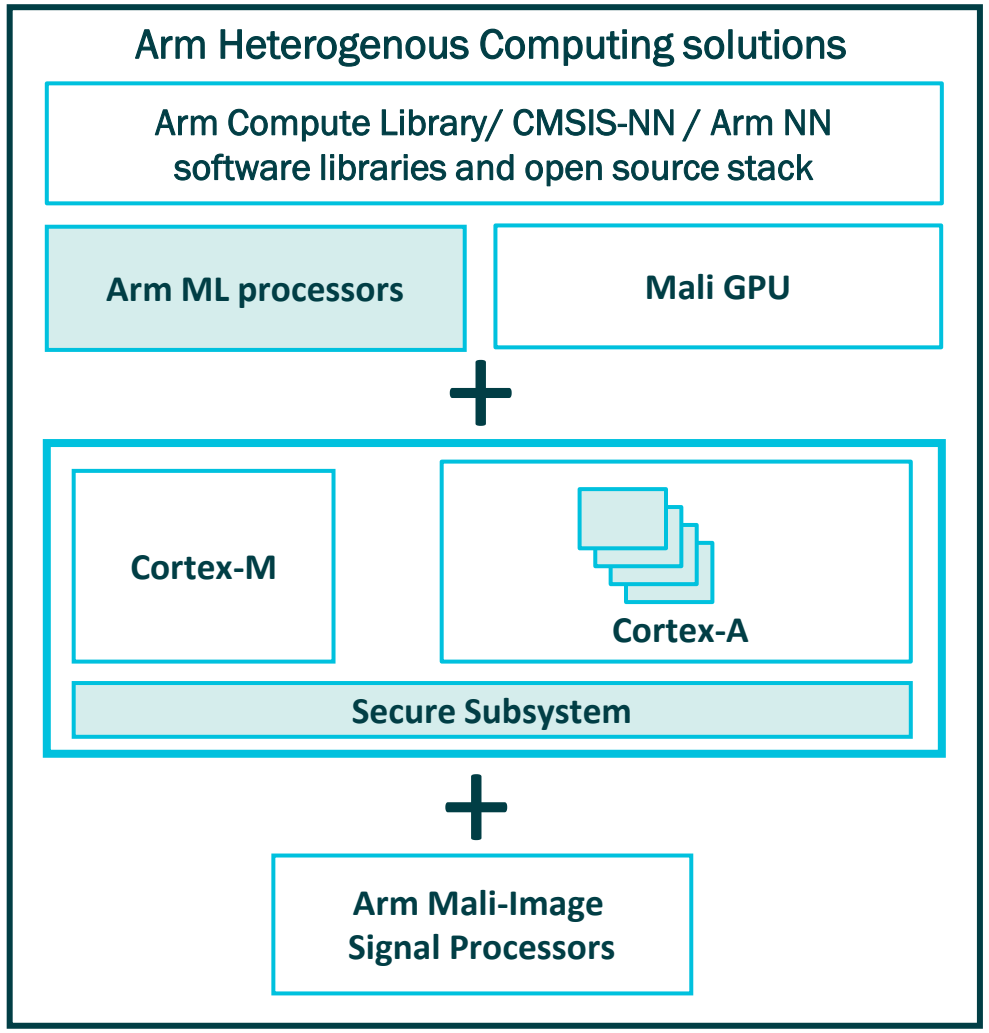
arm Platforms



Arm's Product Portfolio for Camera and Vision Market



Arm is Bringing Compute, Imaging and Artificial Intelligence Capabilities to all Devices



Arm scalable ML computing solutions enable devices to **Think**

Cortex-A and Cortex-M activate devices to **Sense**

Advanced Mali-Image Signal Processors empower devices to **See**

Summary

- The transformation of computer vision and camera products are underpinned by 3 key trends: The shift to edge compute, the focus on security and cloud native enabling machine learning capabilities

- It is essential to embrace a ***standards-based*** approach to speed up the transition to make cameras "***Software Defined***" thus expediting the adoption of vision products to drive the next wave of computing

- Arm is working with many ecosystem partners (OEMs, ODMs, silicon vendors) to drive a standards approach in order to scale deployments by replacing custom solutions with standards-based solution

Resources

Arm Products

Arm CPUs and NPUs

https://www.arm.com/products/silicon-ip-cpu

Arm Multimedia

https://www.arm.com/products/silicon-ip-multimedia

Arm Solutions

https://www.arm.com/solutions/smart-cities

https://www.arm.com/solutions/industrial

https://www.arm.com/solutions/iot

2021 Embedded Vision Summit

Arm demonstrations:

- An Open Source Approach to Cloud Native Vision Workload Deployment on Arm
- Moving the Gym to Your Living Room with Body Pose Tracking on Your mart TV
- Real-time Object Tracking with OpenMV

Thank You

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