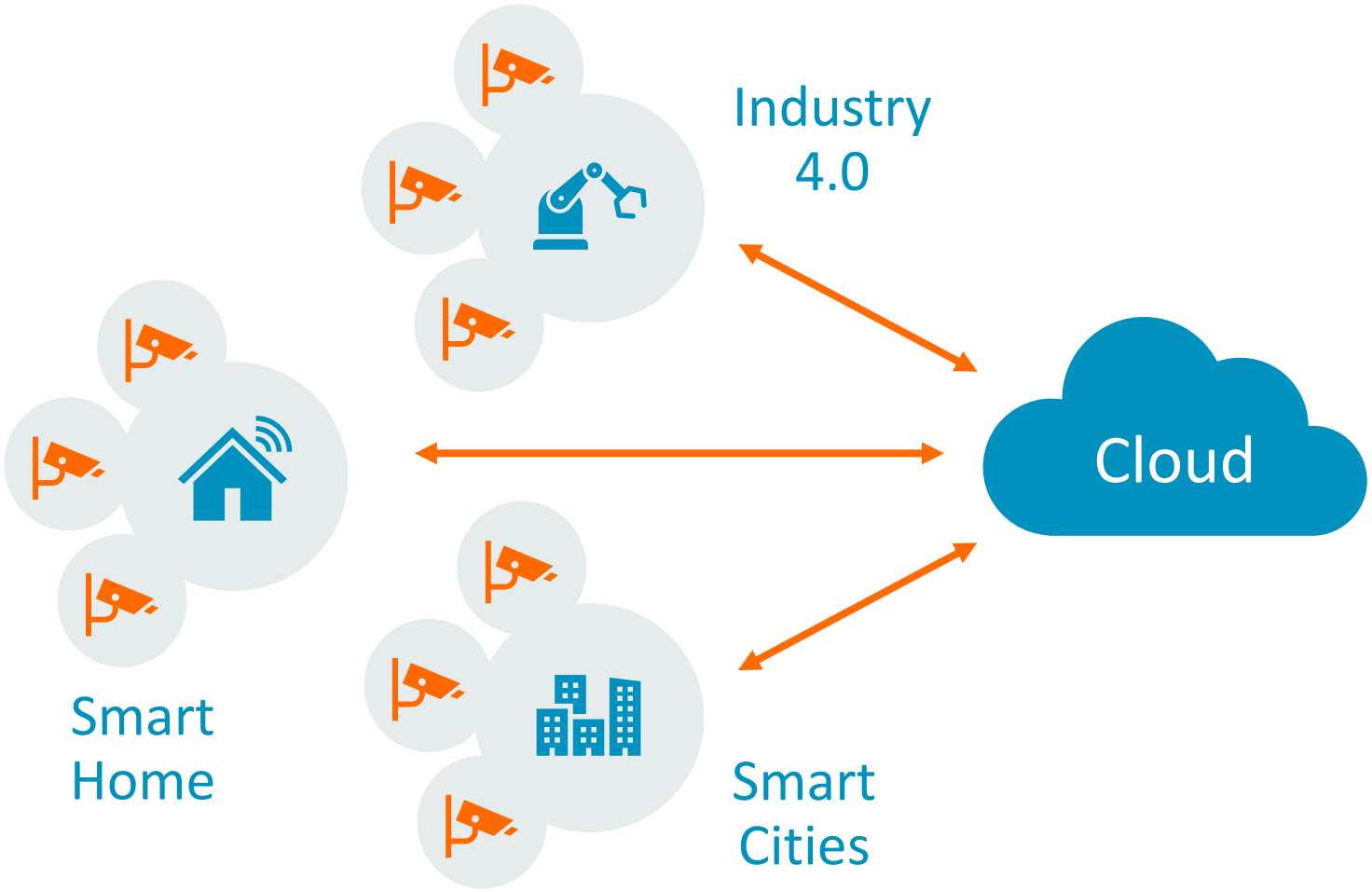
arm

Software Defined Cameras

Smart Camera Deployments are Already Everywhere



arm

Smart Camera Market Bound for Large Growth Ahead

*IDC Worldwide Video Surveillance Camera Forecast, 2020–2025

arm

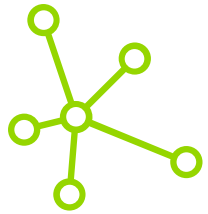
A Trend Pushing For a Large Increase of Functionalities

- ✓ Record video

- ✓ Record video
- ✓ Automated track/monitoring
- ✓ Person/object/activity Identification
- ✓ Cloud connectivity
- ✓ Many other services

arm

Smart Camera Transformation Underpinned by 3 Key Trends



Shift to Edge Compute

AI-enabled intelligent cameras

Increased Security Focus

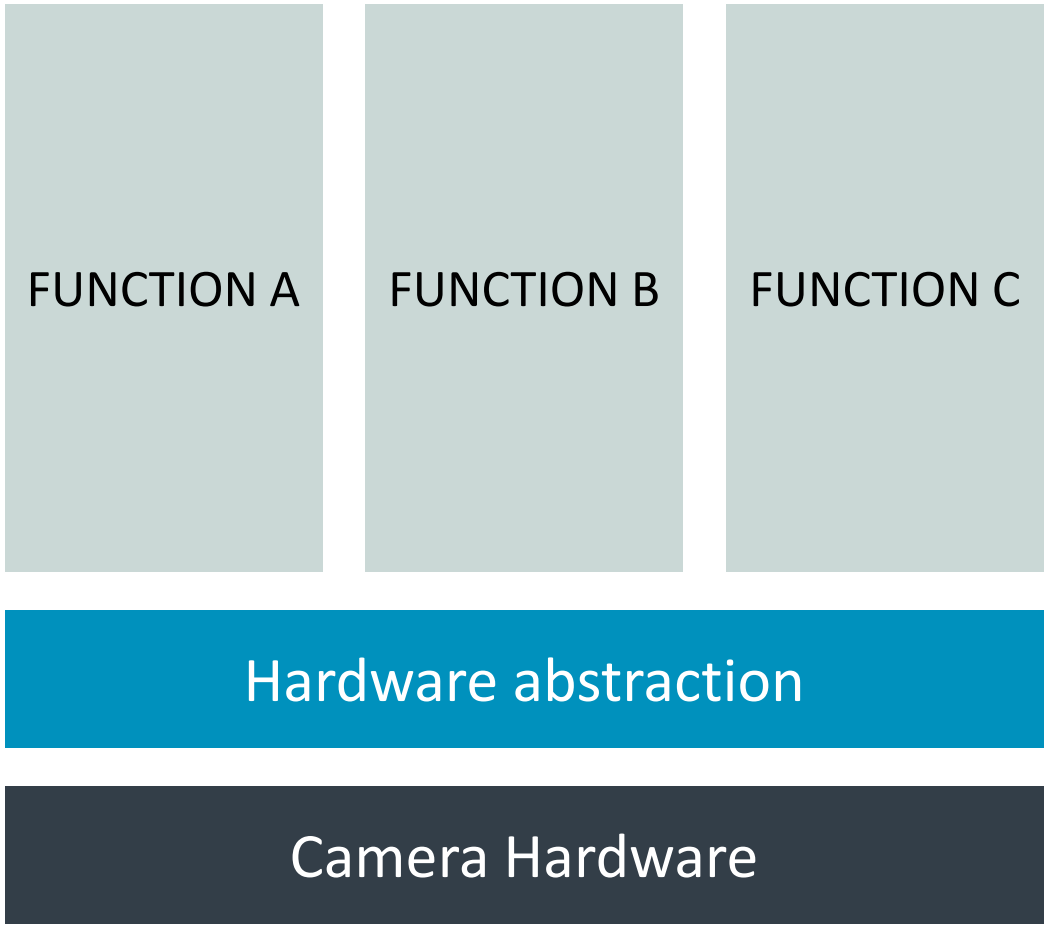
Resilient and secure deployments

Cloud Native

Run cloud-native applications and deploy services over time

arm

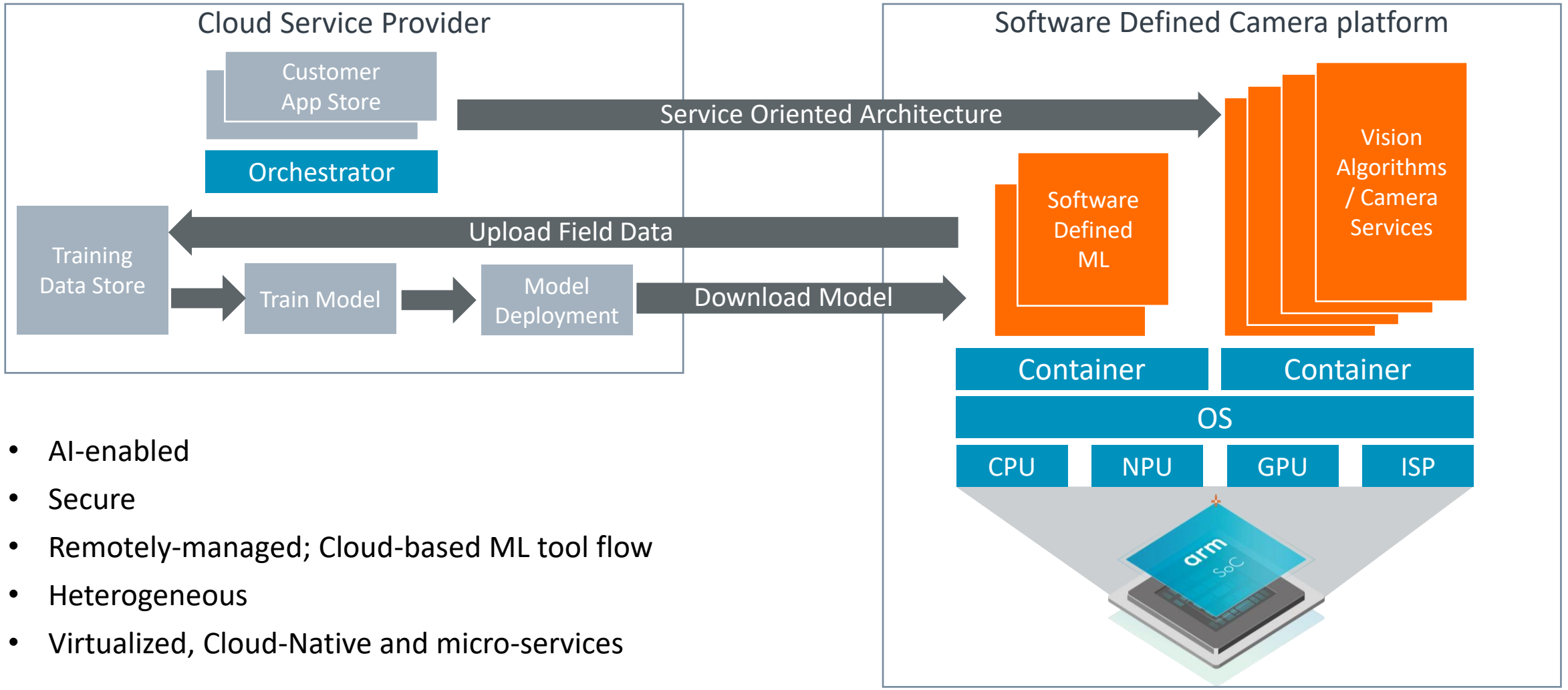
Smart Cameras Are Becoming “Software Defined”



- ❑ 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

arm

Edge Computing is Driving Architecture Evolution of Camera



- AI-enabled
- Secure
- Remotely-managed; Cloud-based ML tool flow
- Heterogeneous
- Virtualized, Cloud-Native and micro-services

arm

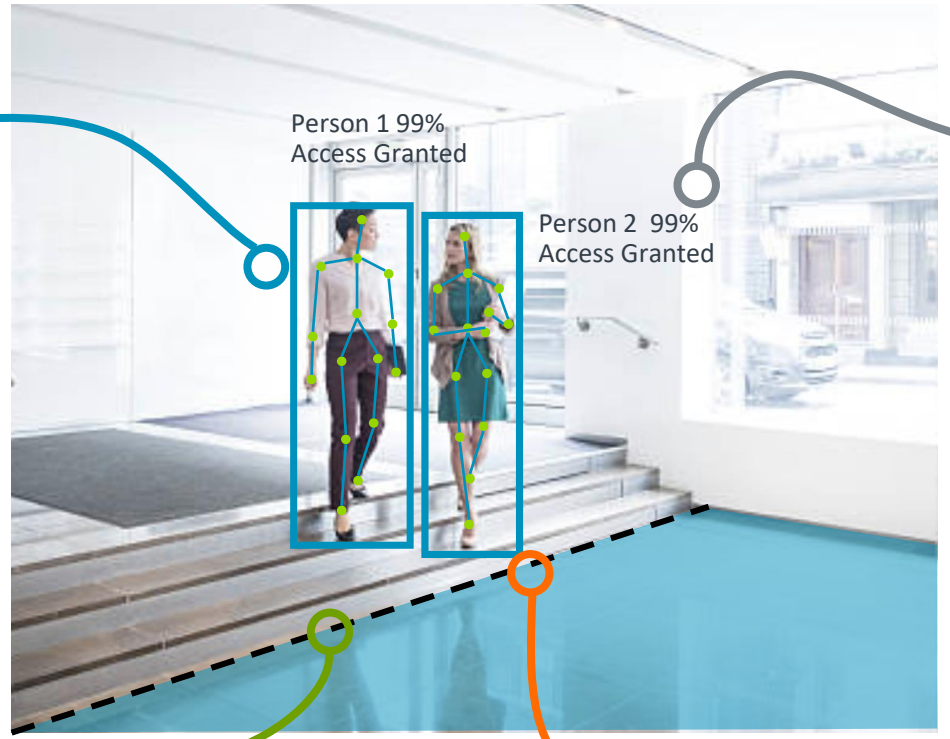
New Applications Are Enabled by ML and AI

Location and Tracking

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

Smart and Secure

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



Automatic Boundaries

- Create boundary conditions quickly with Image Segmentation

Increasing Intelligence

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

arm

Why Security Matters for Smart Cameras

Hardware attacks	**Software attacks**	**Theft of footage**	**Denial of Service**
Modification of footage	**Theft of ML models**	**Unauthorized user access**	**Theft of data**

arm

Ensuring Secure Deployments of Smart Cameras with PSA

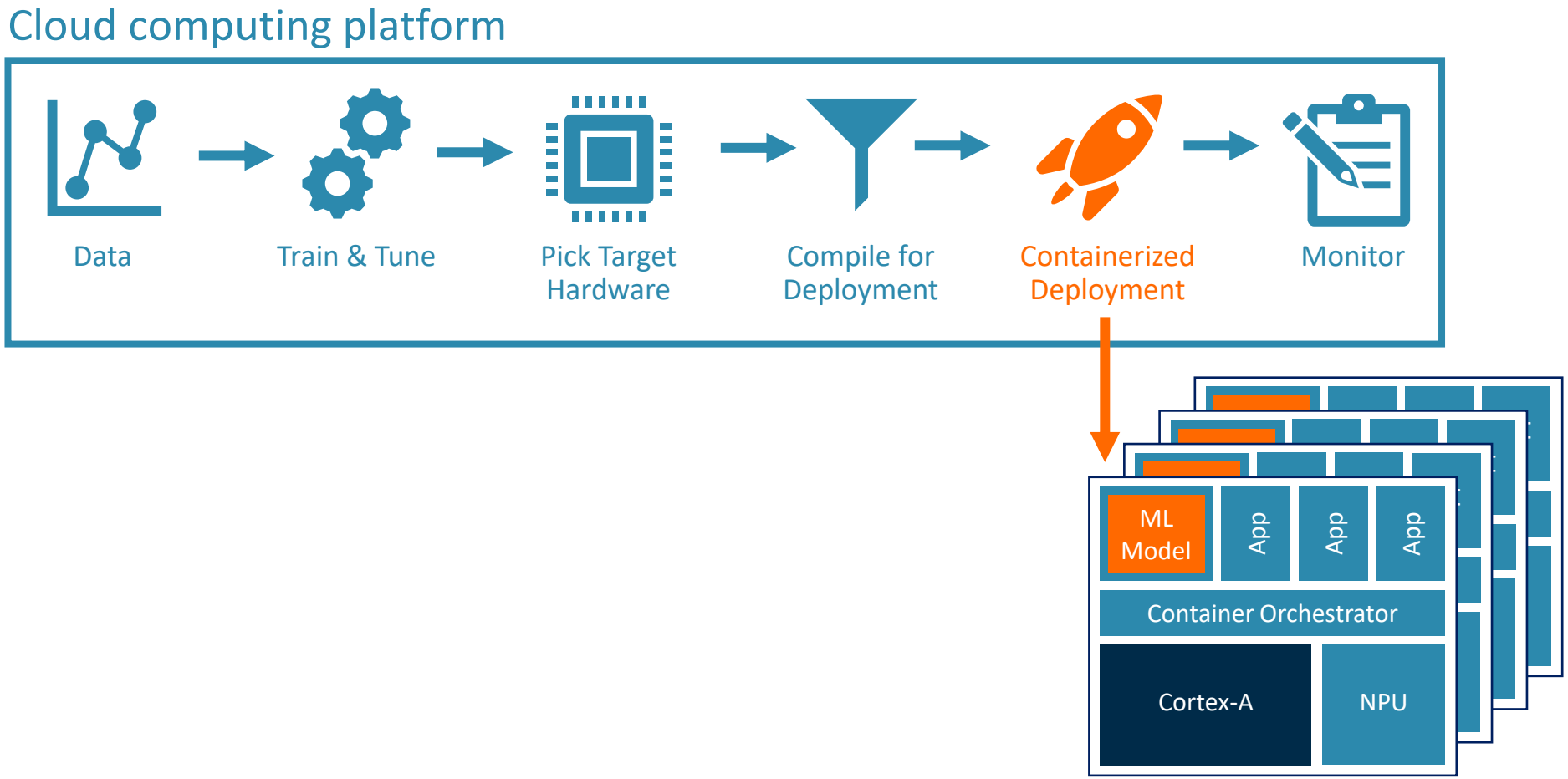
1	2	3	4
Analyze	**Architect**	**Implement**	**Certify**
Methodically developed	Open architecture	Open Source (TF-M, TF-A, OP-TEE)	Enabling trust

PSA Certified is an independent collaborative effort using open-source threat models and government best practices

psacertified™

arm

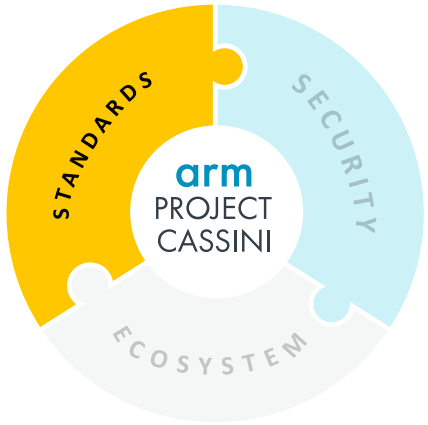
Cloud-Native and Over-The-Air Update to Deploy Services



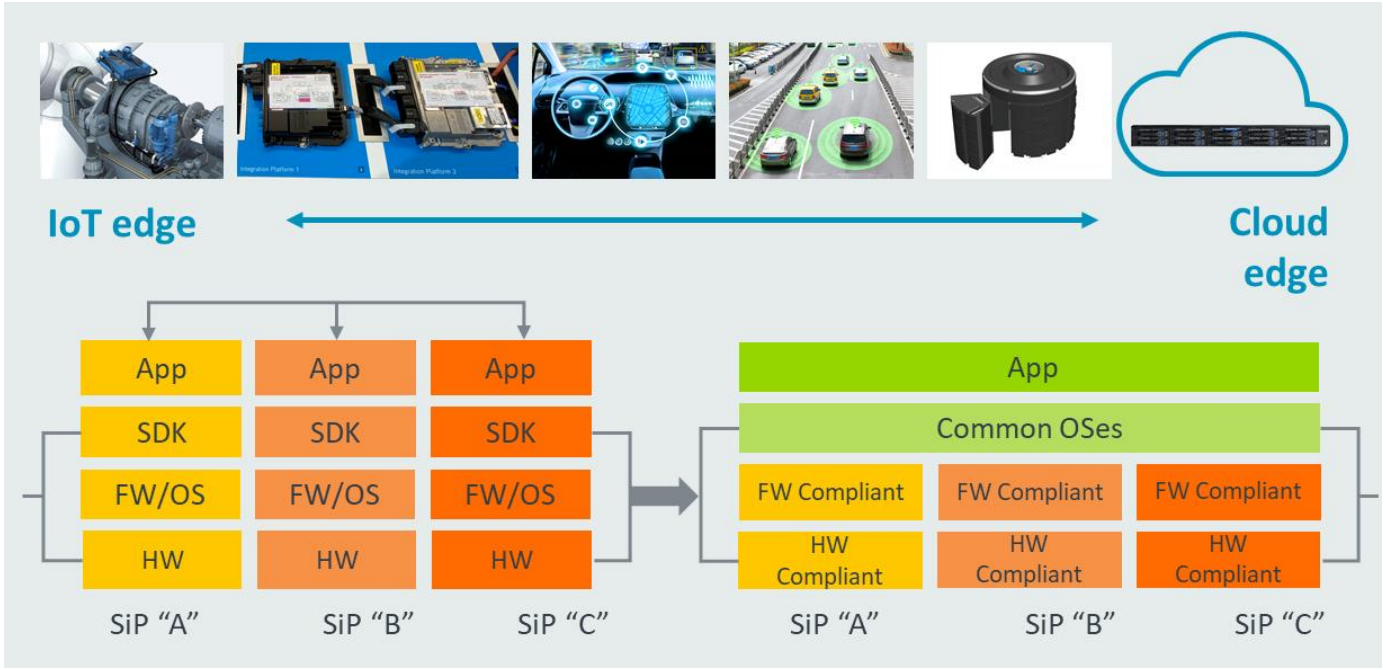
arm

SystemReady: Foundation to Enable Cloud-Native Software

- Implementation standards around the Arm architecture: HW & FW
- Standard, “off the shelf” community or commercial OS, containers and Hypervisors simply ‘work’ on Arm MPUs
- Wider choice of SoCs vendors for multiple camera platforms with frictionless SW portability and CD/CI development principles
- Opens access to the cloud native SW ecosystem



arm SystemReady



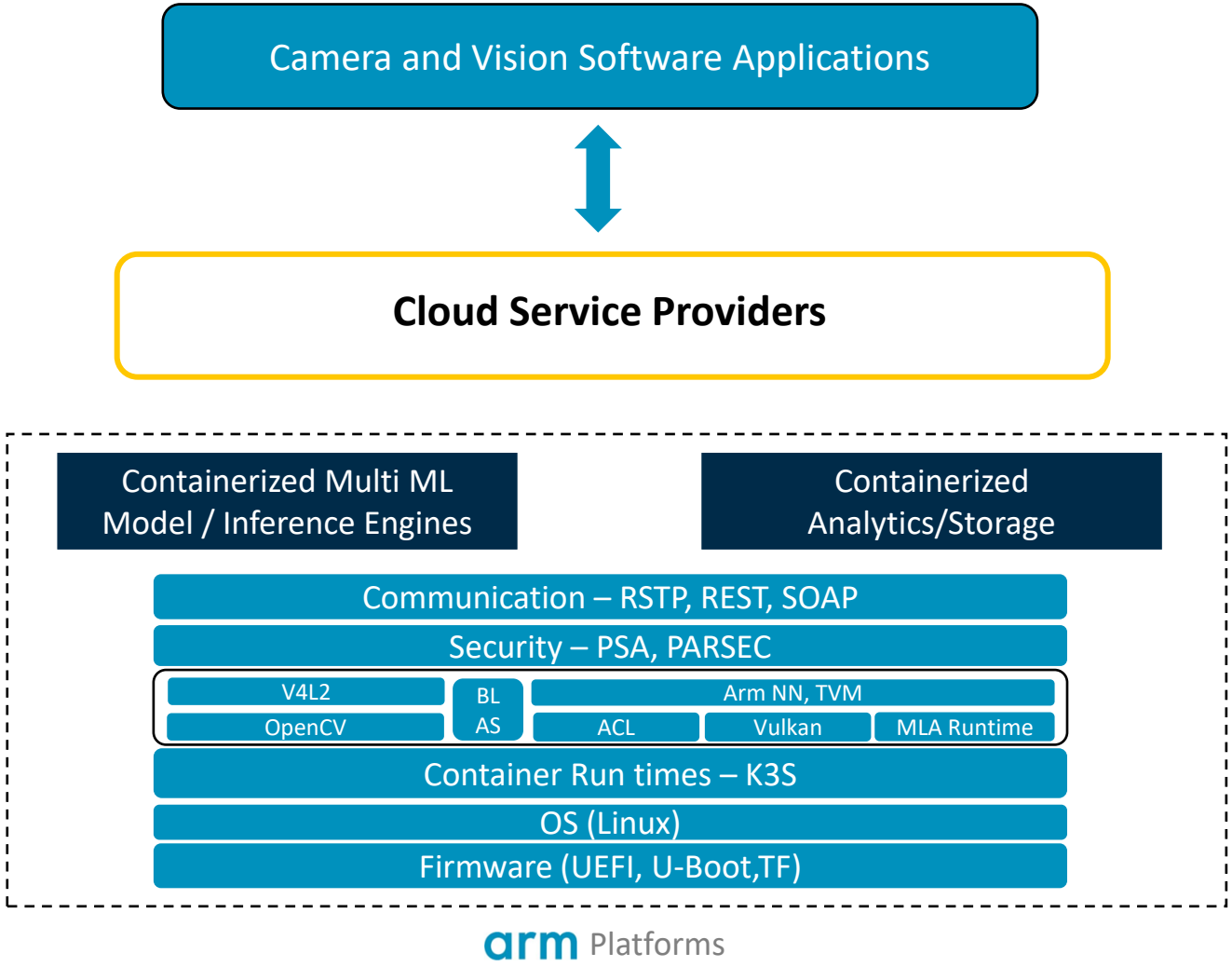
arm

Software Defined Camera Software Architecture Proposal

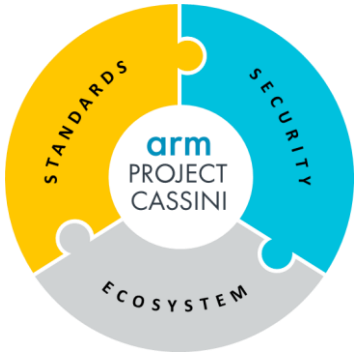
PARSEC
Platform Abstraction for Security

psa certified™

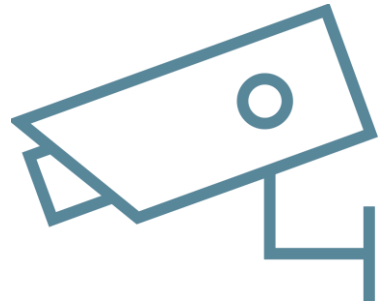
arm SystemReady



arm Platforms



Software Defined Cameras Accelerate Deployments



- Camera deployments are growing rapidly,
  with the market set to reach $44B by 2025
- Smart cameras are becoming edge computing devices,
  with ML workloads redefining their functionality
- Software Defined Cameras abstract hardware from software,
  enabling future-proofed device deployments with OTA updatable services

arm

arm

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