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Project Cassini

Infrastructure Line of Business

Q4, 2019

Context

- Intelligent infrastructure connecting a world of 1T endpoints to the Cloud – *the AI Edge* – is being built
- Diversity across Silicon, platform & application worlds fosters innovative solutions at the AI Edge, but…
- Deploying a cloud-native software stack at the infrastructure edge remains a significant challenge

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Goal

Ensuring a cloud-native experience across a diverse and secure edge ecosystem

Collaborate with Arm to

Define Platform Standards & Reference Systems
Adopt PSA extended for a secure Infrastructure Edge
Enable Cloud-native Software stacks for the Edge

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Platform Standards & Reference Systems

Platform Standards – Background

- The Infrastructure edge hosts a diverse array of platforms
  - Traditional-embedded, fixed-function gateways
  - General purpose compute with heterogenous accelerators
- Mature firmware + OS ecosystems co-exist
  - Embedded / RTOS, U-Boot, Commercial BIOS
  - Standard / Enterprise OS, Hypervisor, Bare-metal solutions

Platform standards at the AI Edge influenced by

- **Deployment** model → High-touch, per-system management vs. 3rd party-ready
- **Functional** model → MUD-based vs. general purpose compute
- **Management** model → System management & security updates – remote vs. local

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Platform Standards – SBSA / SBBR

- Arm supports standards versus specific implementations
- Recommendations and guidelines uniformly apply to all platforms from the Infrastructure Edge to the Cloud / Datacenter

For **all platforms** expected to host 3rd party Commercial OSes, Hypervisors, or other bare-metal solutions → SBSA / SBBR

Examples:- Red Hat, Windows, VMware ESXi,..

SBSA / SBBR

Minimum Hardware requirements → SBSA
Minimum Firmware requirements → SBBR
Arm provides → Certification Program (ServerReady) + Compliance Test Suites (ACS)

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Platform Standards – EBBR

Platform characteristics
Traditional/Embedded with varying degrees of per-platform engineering enablement, support & maintenance

For such Platforms that host a vertically-integrated stack derived from community distributions (Yocto/Linux, BSD or other), EBBR minimizes custom engineering effort on the Firmware-OS interface

Moving towards EBBR

1. Leverage UEFI by merging BSP to mainline U-Boot
2. Check EBBR-readiness with community-managed open-source tool from Arm → *(WIP)*

Under consideration

- Android, Coreboot + LinuxBoot

Reference list of SBSA/SBBR platforms

For the latest on SBSA/SBBR platforms and partners, please go (here)

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Platform Standards - Summary

1. Arm recommends SBSA/SBBR as the de-facto standard for all platforms esp., in cases where 3rd party & managed software – OS, Hypervisors, etc. – are expected to run

2. When SBSA/SBBR is not feasible, esp. where vertically integrated OS stacks are enabled and managed, Arm recommends EBBR-compliance to reduce custom engineering efforts and to allow community distros to support Arm platforms

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Platform Security

Security for the Infrastructure Edge

Background

- At the AI Edge, implementations for **Root of Trust (RoT)** & **RoT Service APIs** are heavily fragmented, between endpoints, edge, cloud, test and development environments, and across processor architectures and platforms
  - RoT examples:- TPM, HSM, Secure Element, …
  - RoT service API examples:- PKCS11, TPM2.0, …

Solution

PSA (Platform Security Architecture) solves fragmentation through architecture, reference SW and certification with market traction in the constrained IoT space

Project Cassini extends PSA to the infrastructure edge

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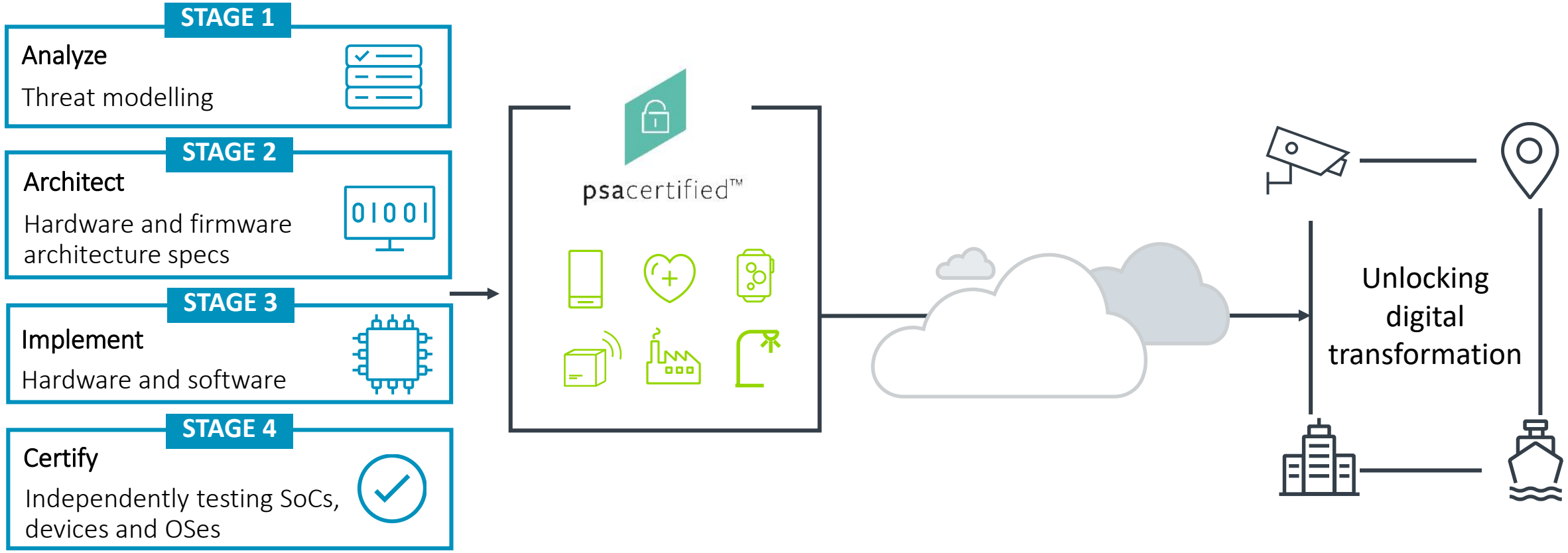
PSA for constrained IoT devices

The open device security framework, with independent testing



PSA: enabling right-sized device security

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PSA extensions for the Infrastructure Edge

PSA for M-profile (constrained IoT) deliverable	PSA for Infrastructure Edge deliverable
Threat models	New Threat Model and Security Analysis (TMSA) for the Edge
Firmware Framework-M	Firmware Framework-A
Trusted Boot and Firmware Update	Same
PSA APIs (Crypto, Attestation, Secure Storage)	Same A new open-source security microservice: **PARSEC**
Trusted Firmware-M	Trusted Firmware-A New features being added to support the needs of infrastructure
Certification scheme	In progress – Working to understand market need
-	New SBSG – Server Base Security Guide

For details – please see white paper https://bit.ly/311Pb3Q

Security for the Infrastructure Edge – PARSEC

The gap between Secure Hardware & Cloud native software worlds

- Key benefit of cloud native → software abstracts the platform
  - Once software is packaged (e.g. as a container), can be deployed anywhere
- But the best security is rooted in hardware..
- Plumbing hardware directly into cloud native stacks, weakens ‘run anywhere’ benefits

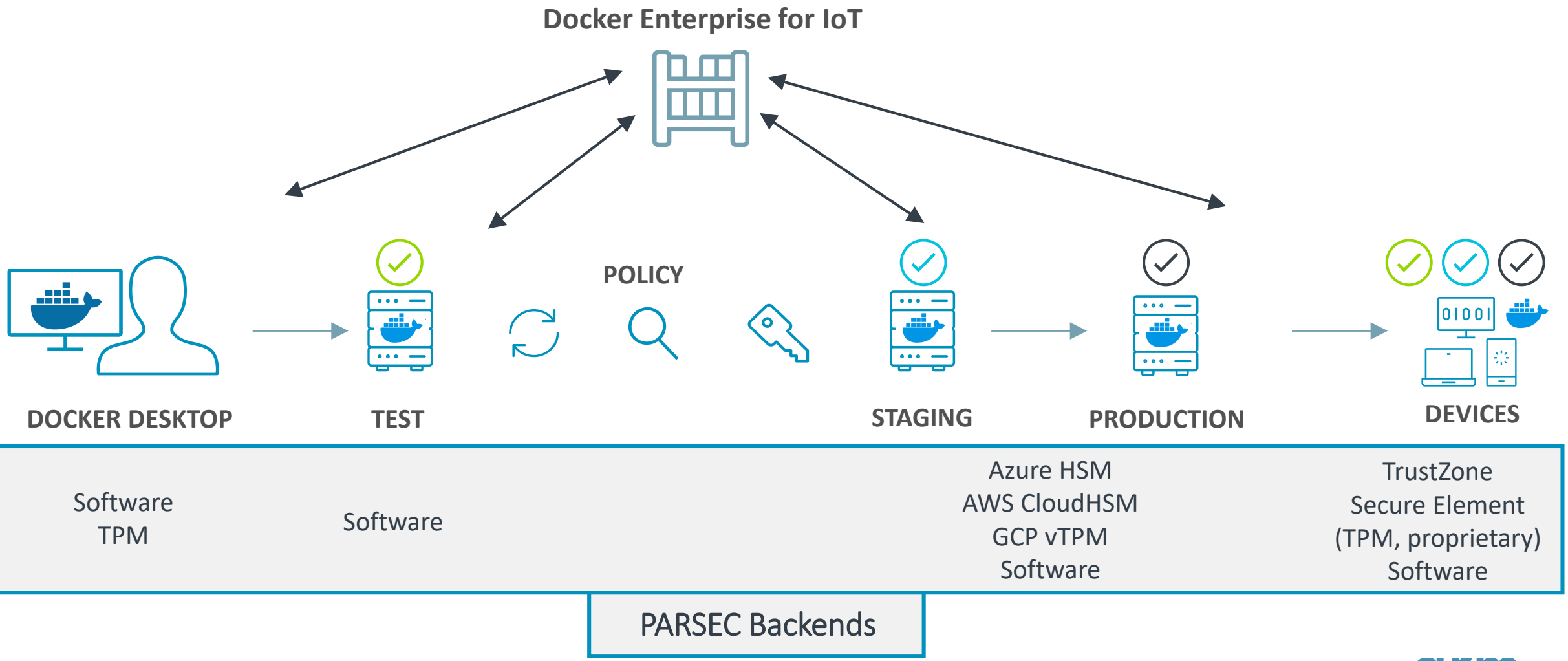
PARSEC

Provides applications, access to security services in a Project Cassini platform

- Architecture neutral
- Reference implementation available in PSA software
- Originally developed in collaboration with Docker
- Currently independently hosted as open source with plans to seed to a community project

End-to-End Integrated Hardware Backed Platform Security

PARSEC Collaboration with Docker



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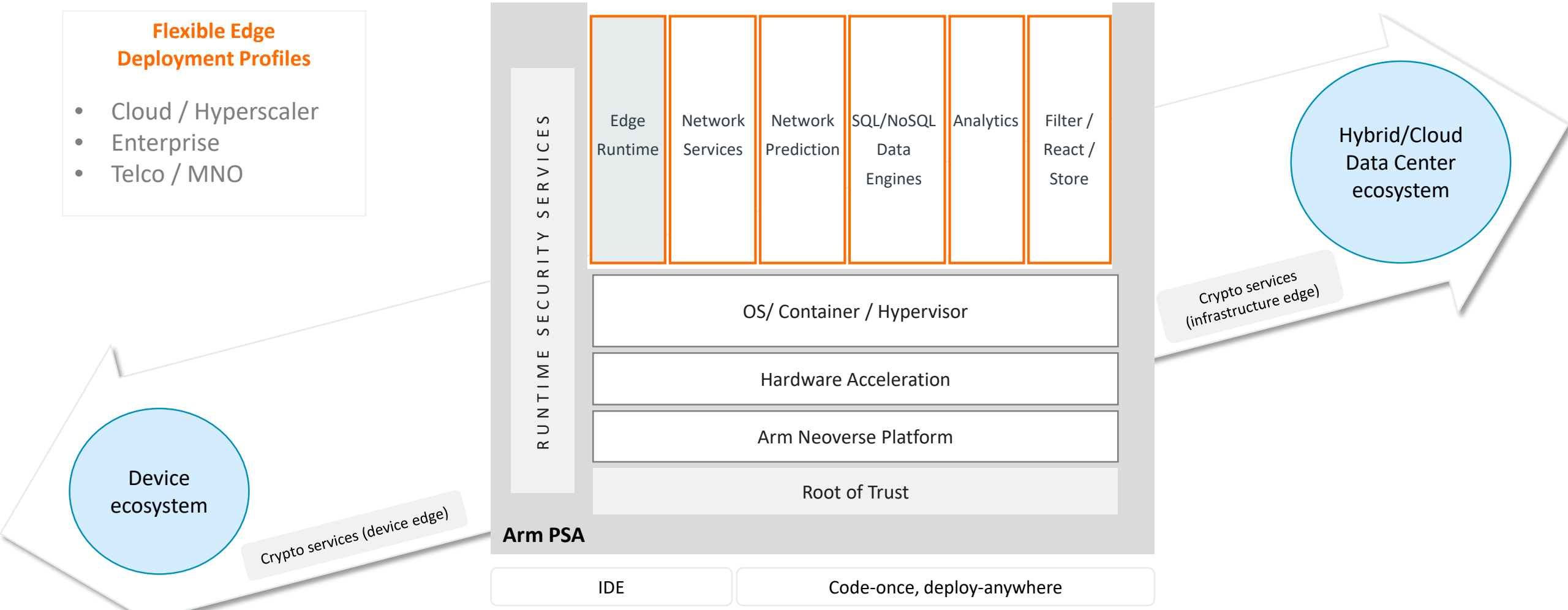
Cloud Native stack for the AI Edge

The AI Edge Technology Stack

Flexible Edge Deployment Profiles

- Cloud / Hyperscaler
- Enterprise
- Telco / MNO



Engaging on Project Cassini

Partner with Arm on PoCs to

- Enable standards-based edge & gateway platforms
- Integrate PSA / PARSEC APIs into Software runtimes
- Establish joint value propositions through end-to-end demos

project-cassini@arm.com

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Thank You
Danke
Merci
谢谢
ありがとう
Gracias
Kiitos
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