IoT Device security

Ashutosh Singh

Agenda

Connected devices common use-cases

Device security challenges

Common security functions across use-cases

Introduction to Platform Security Architecture (PSA)

Introduction to Trusted Firmware M

Questions

Please feel free to interrupt during the course of this presentation!

Usage Patterns & Device Security Challenges

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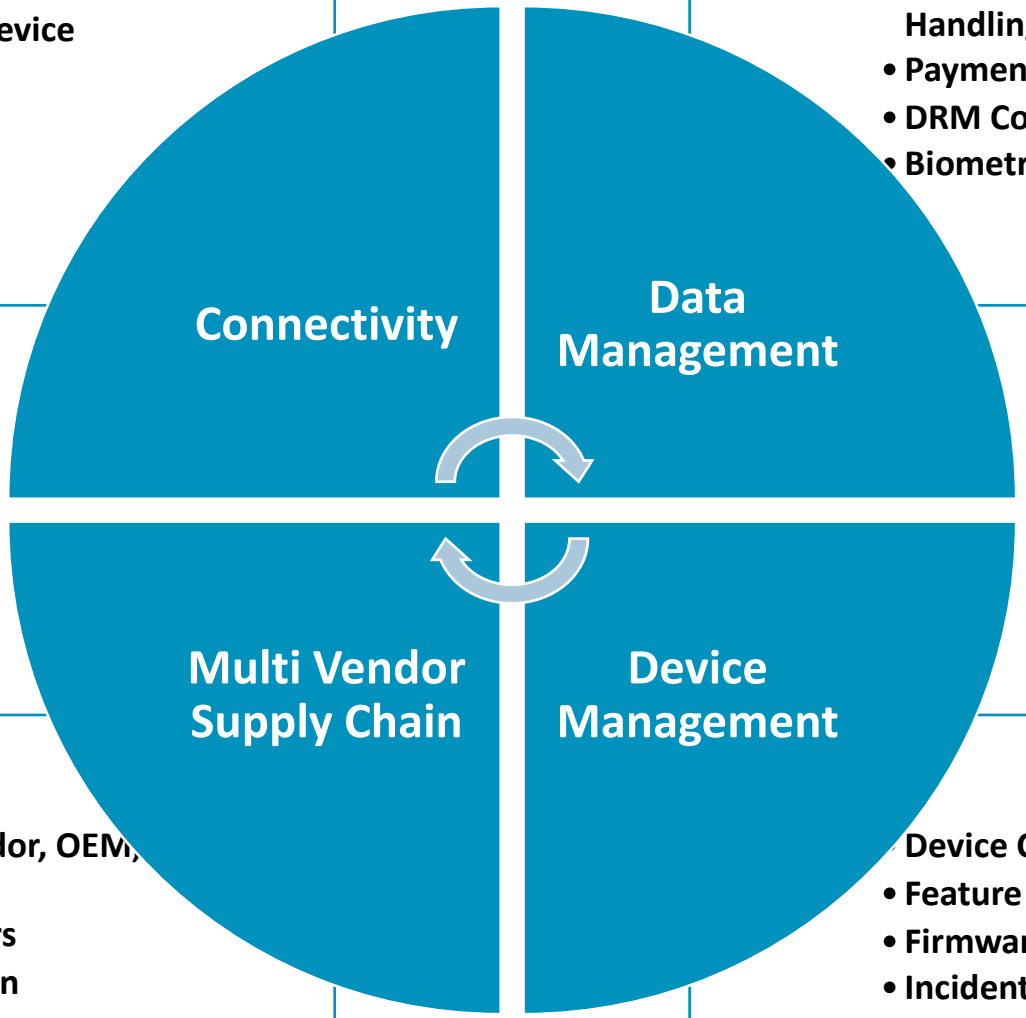
Common Usage Patterns

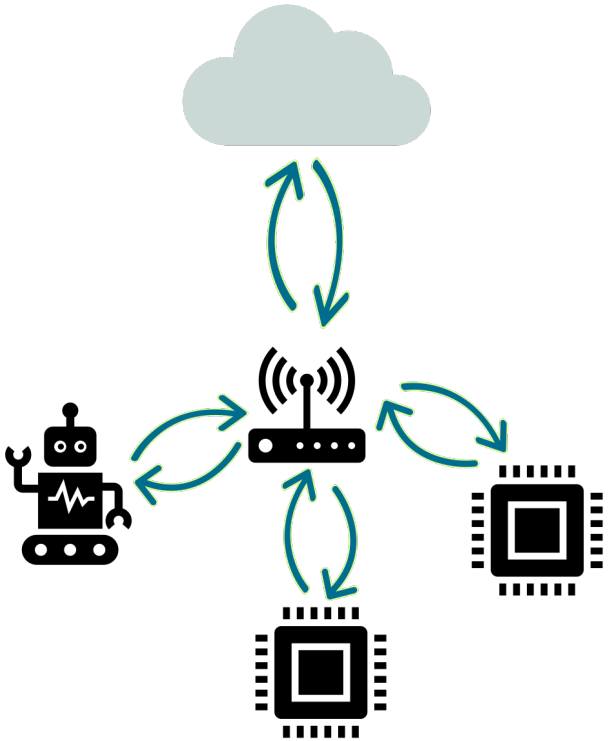
- Device to Cloud
- Device to Device

- Sensor Data Handling
- Payment Processing
- DRM Content
- Biometric data



- Silicon Vendor, OEM, OS Vendors
- APP Vendors
- IP Protection

- Device Configuration
- Feature certificates
- Firmware Update
- Incident Mgmnt



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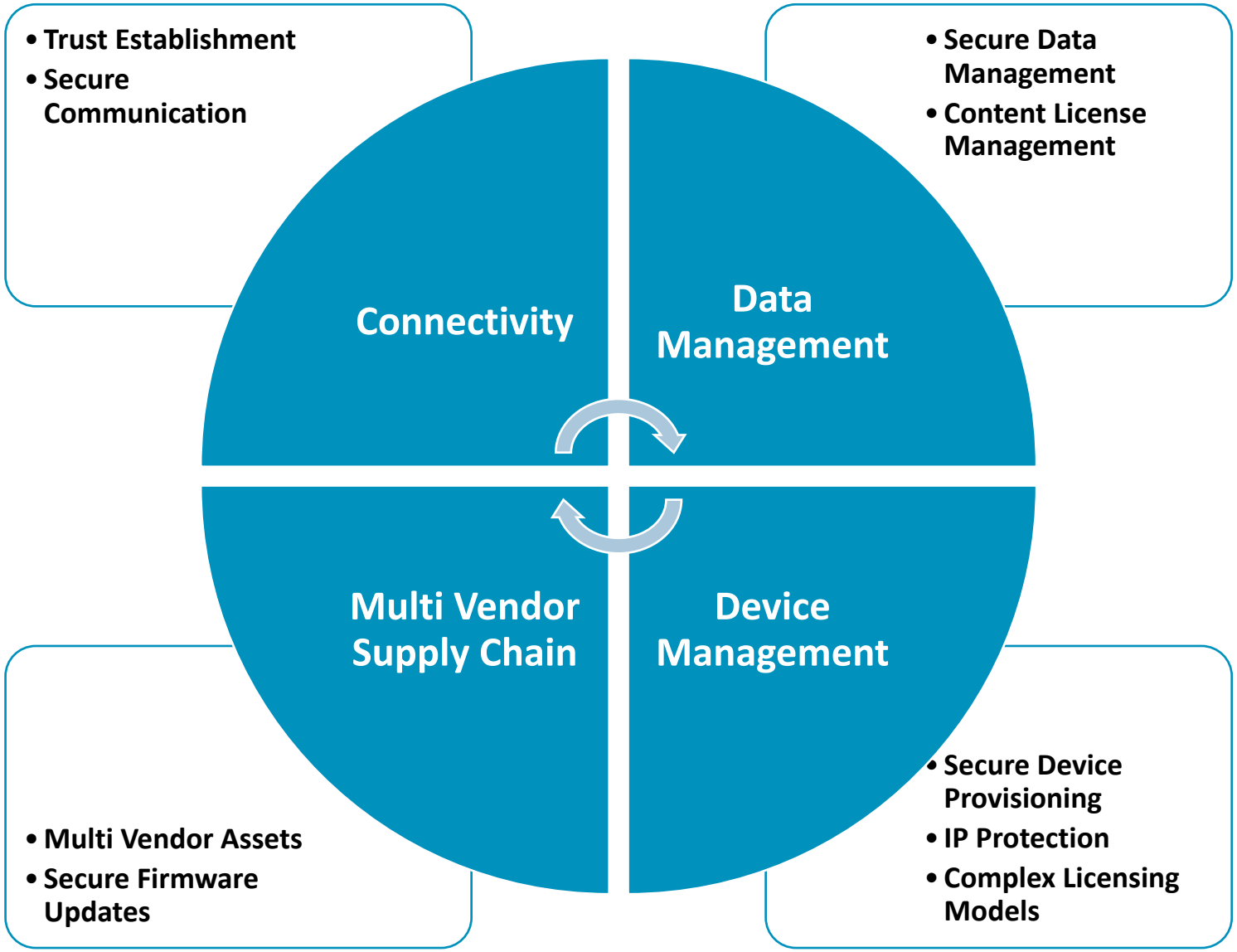
Security Challenges



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Device Security Building Blocks

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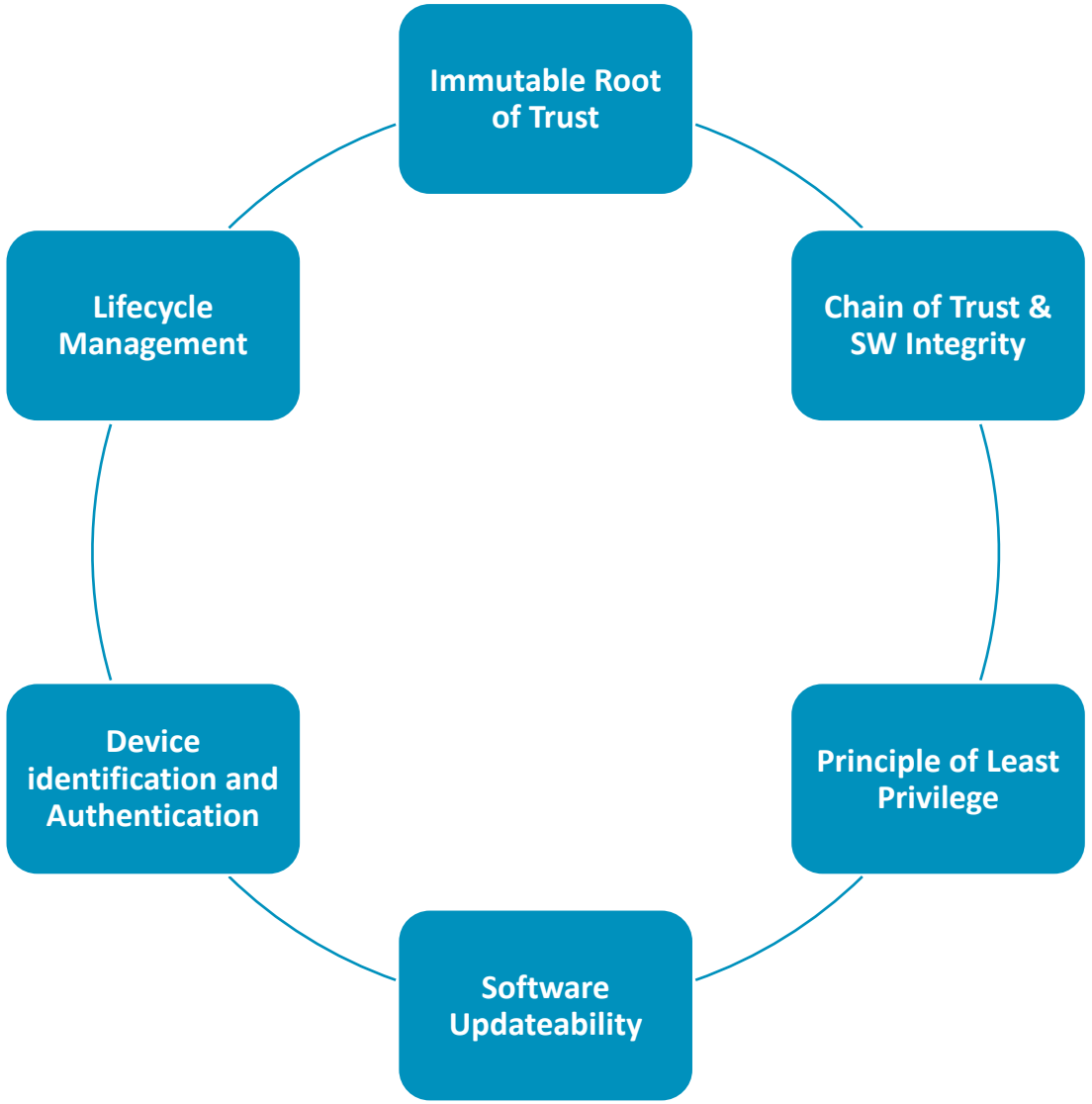
Common Security Functions



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Root of Trust and Chain of Trust

LIFECYCLE STATES

Immutable RoT

ROM Code

Key signing Pub key

- Likely to be part of RTL
- Authentication of updateable bootloader
- Assist in factory floor device provisioning

Updateable Bootloader

Hardware Unique Key RNG

Image signing Pub key

Monotonic counter

- Runtime SW authentication
- Firmware update process
- Key derivation tree and boot seed
- Boot signature measurements

Runtime Software

RNG

Use-case keys

Crypto accelerator

- Business use-case
- Secure communication
- Firmware update support
- Compartmentalization

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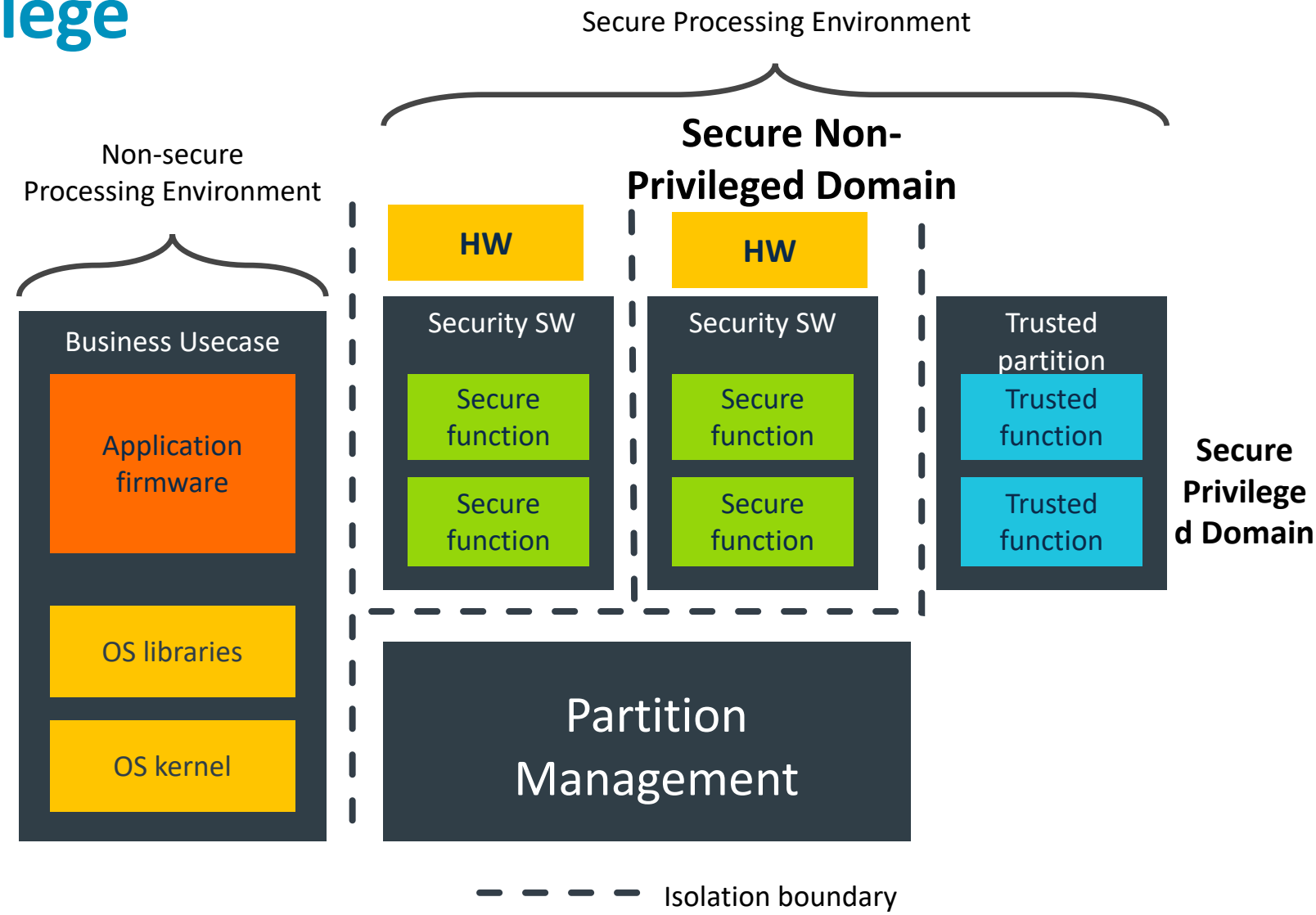
Principle of Least Privilege

- SW and HW compartmentalization
- Cryptographic key hygiene
- Multivendor scenarios with mutual distrust



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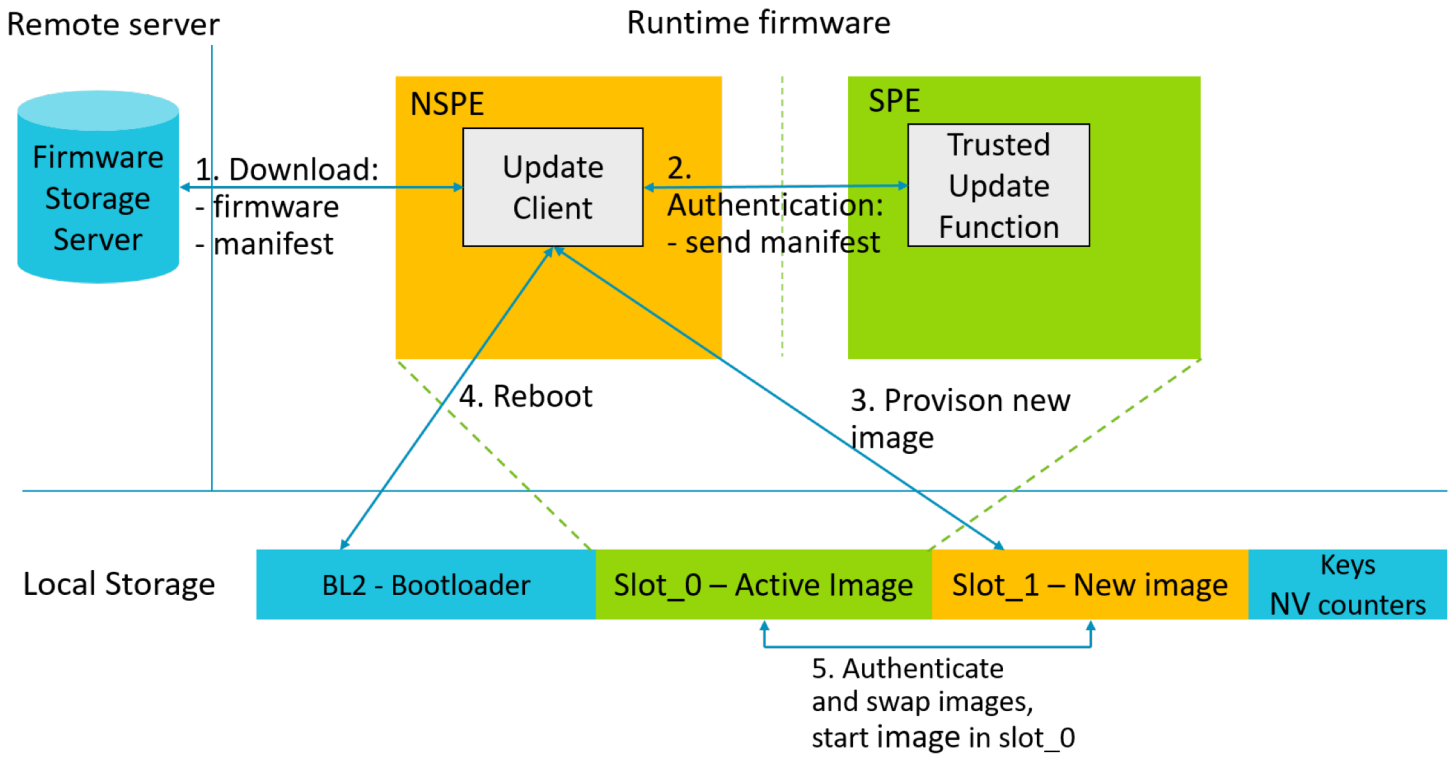
Firmware Update

- SW/HW vulnerability fixes
- Multivendor software updates
- Public key based image authentication
- Rollback Protection



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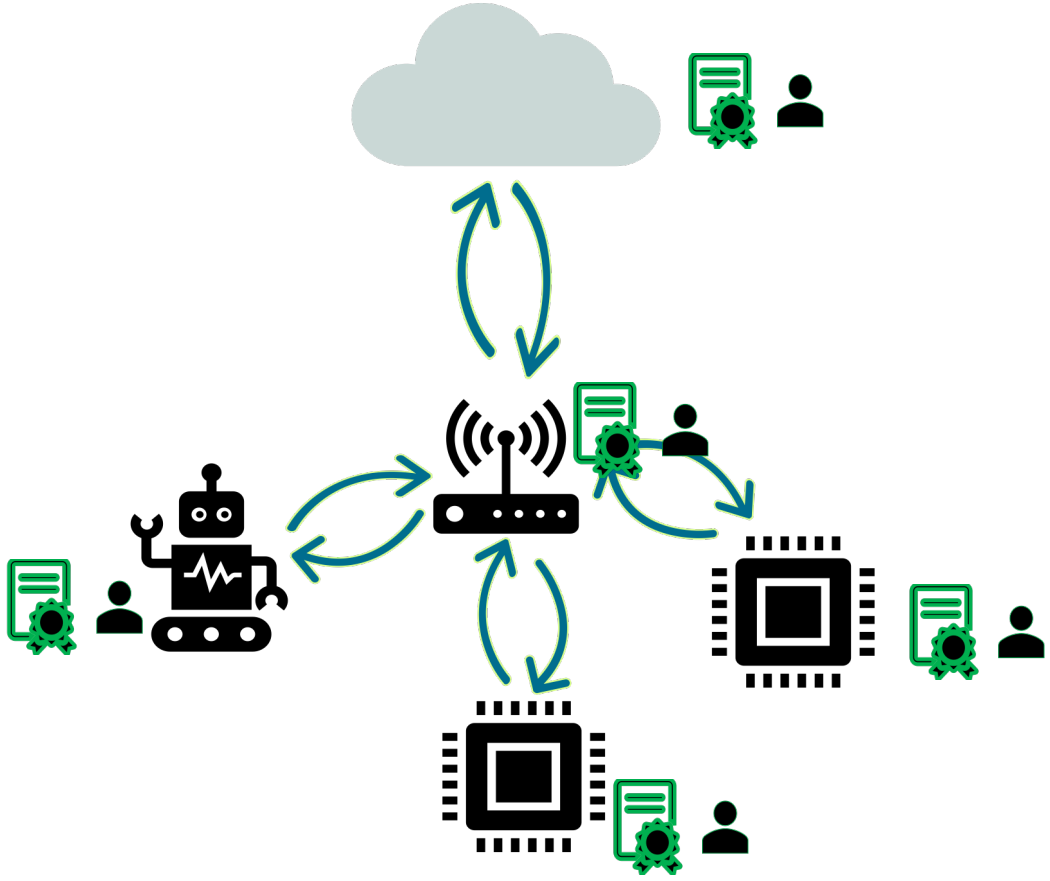
Device Identification and Authentication

- Immutable Unique Identity
- Certificate based authentication
- Device attestation



Lifecycle Management

Silicon Manufacturing

- RTL Key
- Feature control

- Secure device provisioning
- Feature subscription licensing models

OEM/OS Vendors/ APP Vendors

- Key provisioning
- Firmware Provisioning

- Secure device provisioning
- SW Integration

Field Deployment

- Keys
- Subscription Certs
- HUK

- Multiple vendor (apps, firmware fragments) management
- Device Recall

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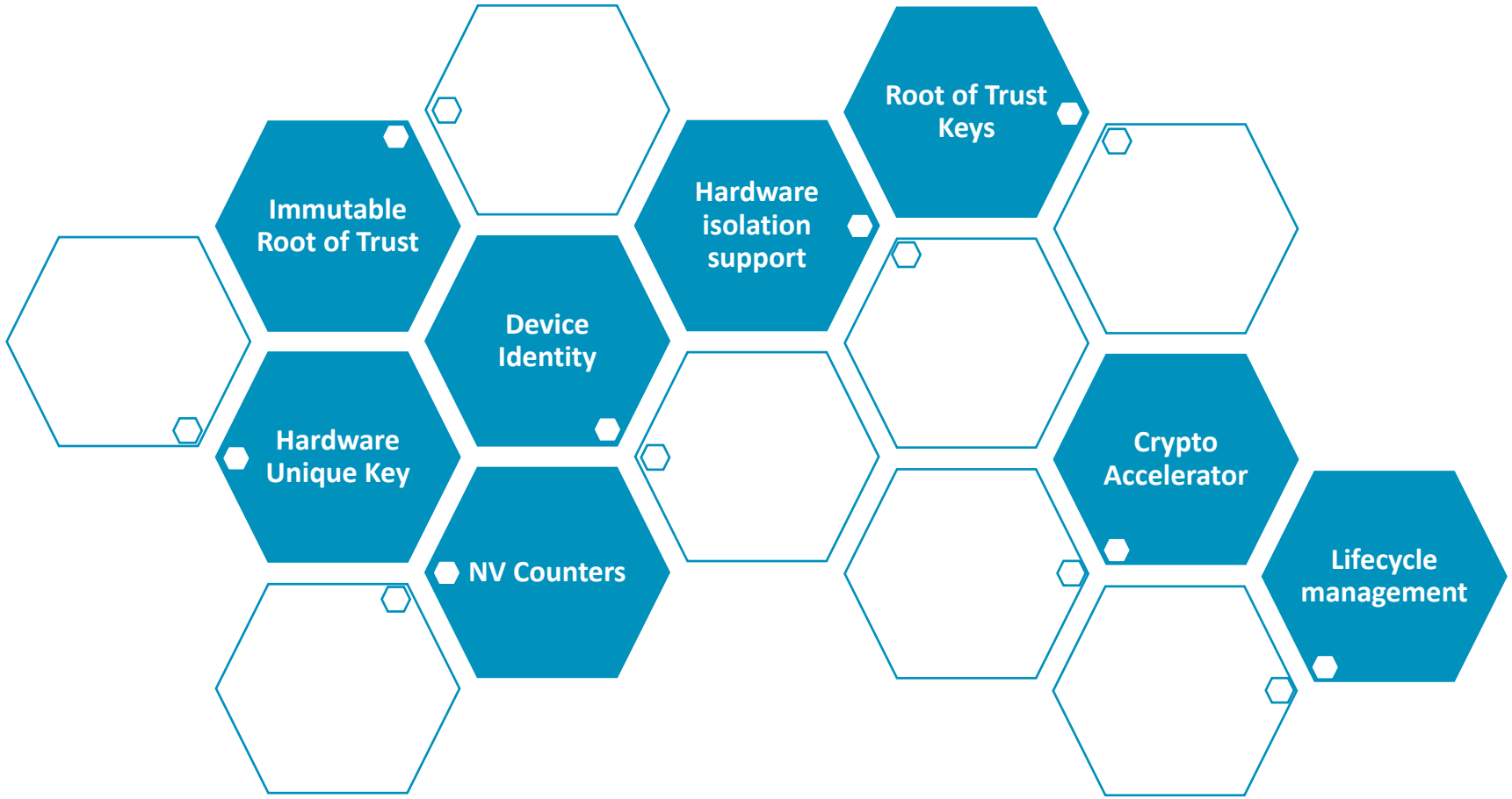
Hardware Building Blocks



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Platform Security Architecture

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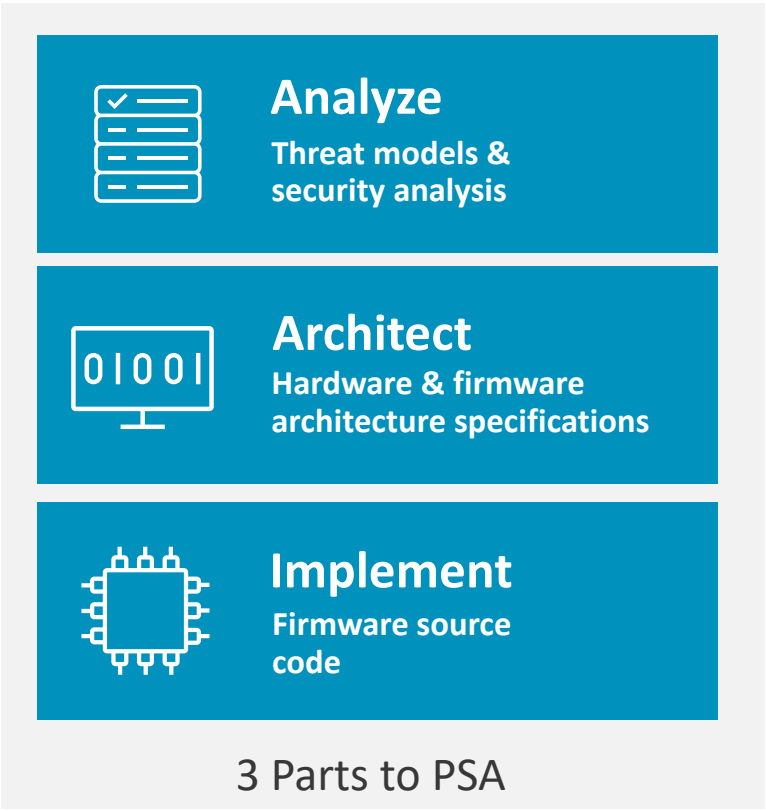
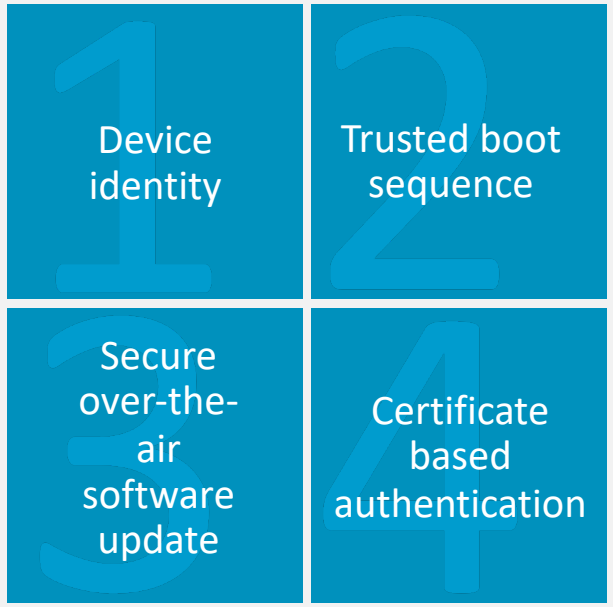
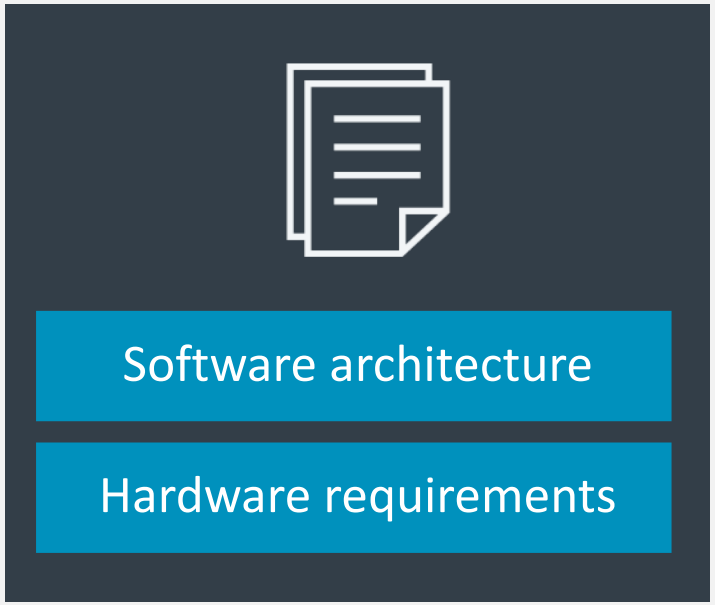
Platform Security Architecture



3 Parts to PSA



Common principles across multiple use cases



Architecture & Specifications

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Trusted Firmware M

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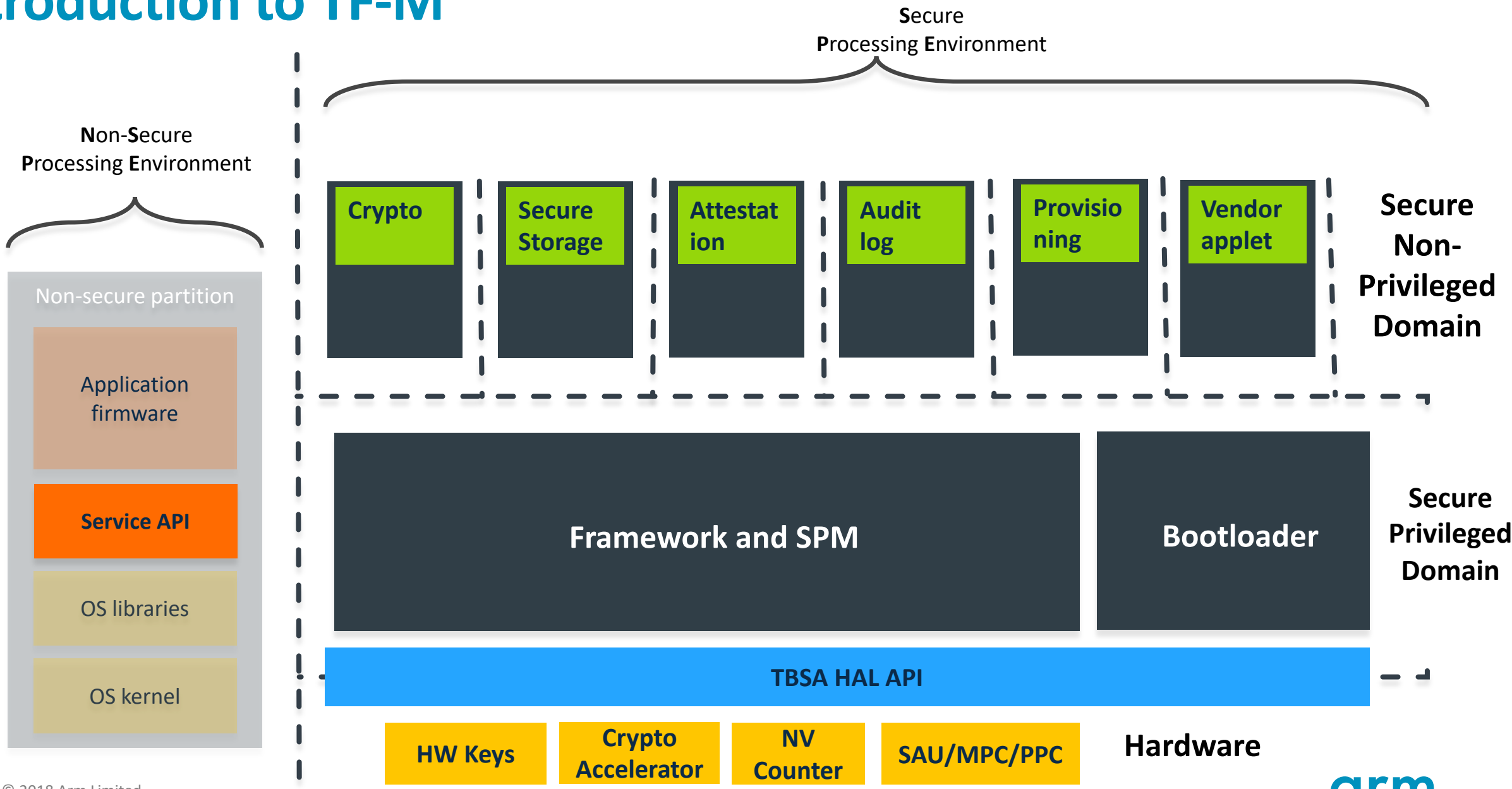
Introduction to TF-M



Securing Use-cases with TF-M

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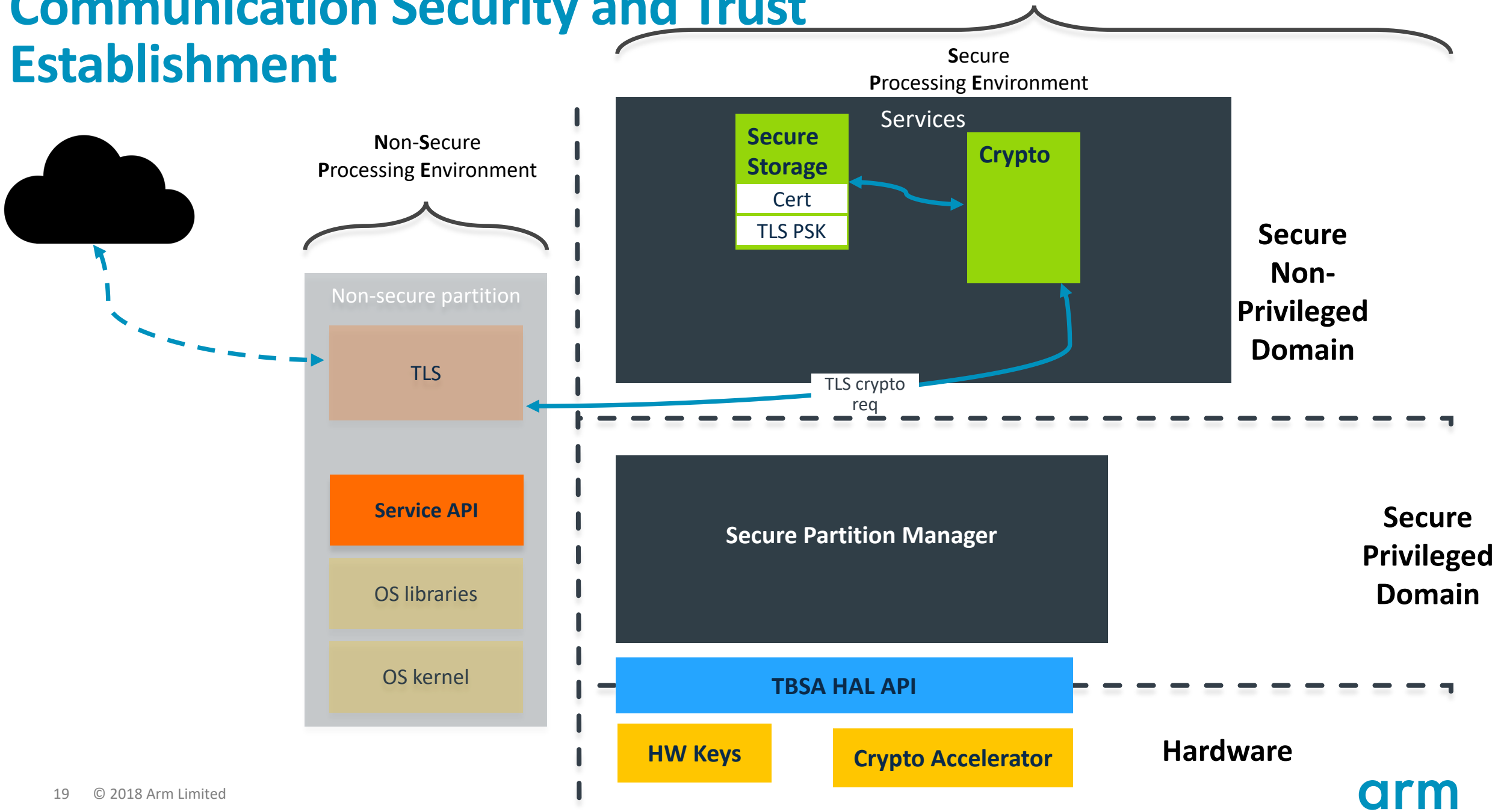
Communication Security and Trust Establishment



How to get involved

TF-A and TF-M master codebases

- https://git.trustedfirmware.org/

TF-M Team @ OpenIoT Summit Europe 2018

- Shebu Varghese Kuriakose
- Ken Liu
- Miklos Balint
- Ashutosh Singh

Get in touch

- Come round to the Arm booth during the summit
- Contact TF-M team at support-trustedfirmware@arm.com

TF-M Secure Partitioning Talk – Wednesday, October 24 • 14:15 - 14:55

More info on developer.arm.com and trustedfirmware.org

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Thank You!
Danke!
Merci!
谢谢!
ありがとう!
Gracias!
Kiitos!
감사합니다
धन्यवाद