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TF-M Services on Multi-Core System

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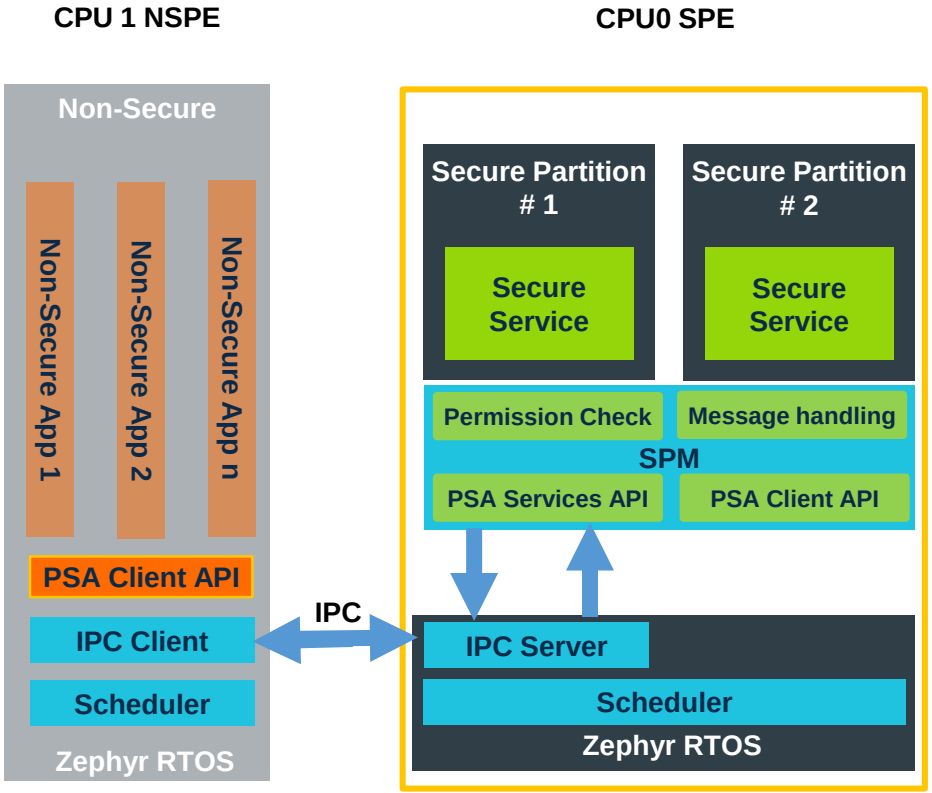
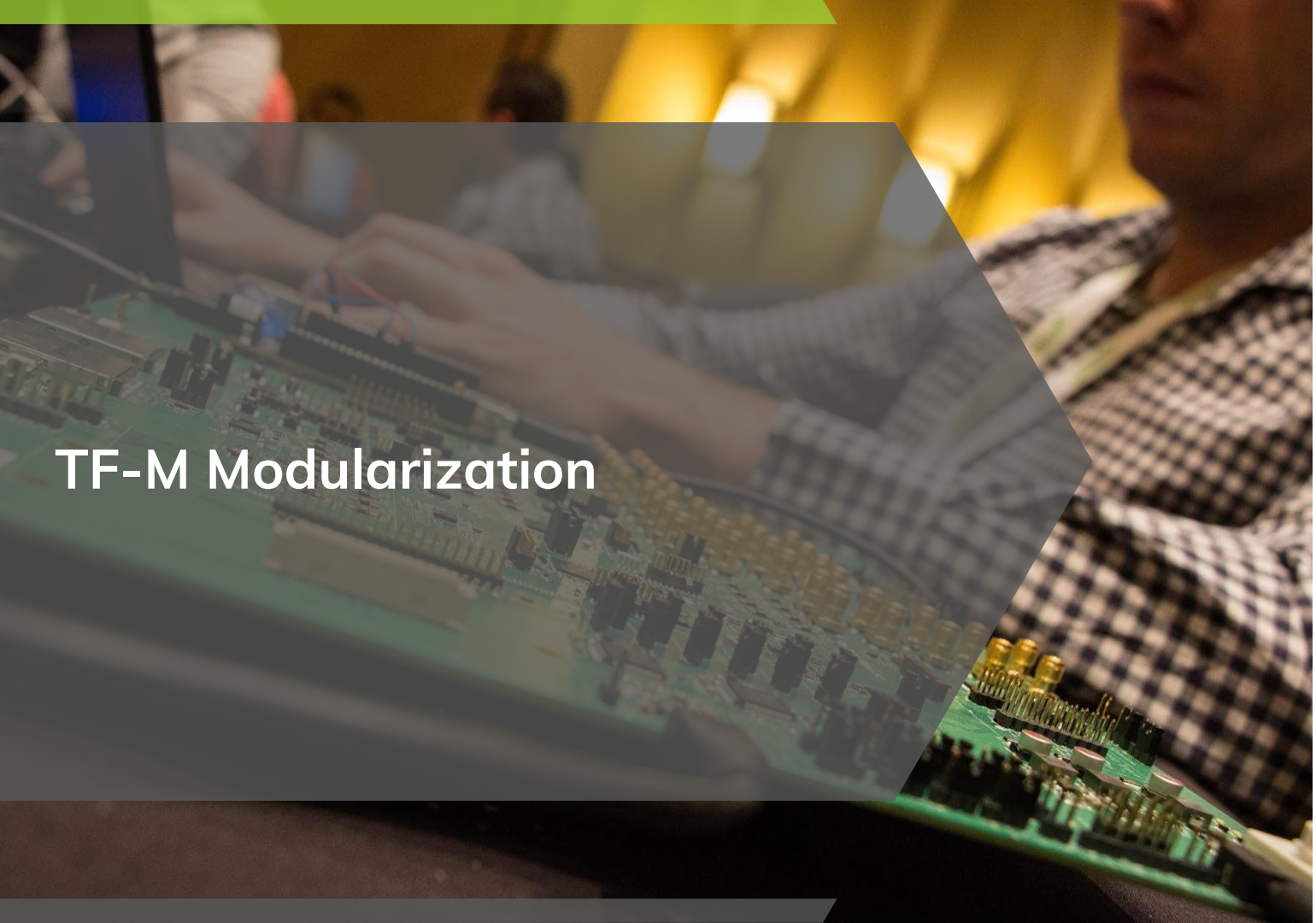
Agenda

- Overview
- TF-M Modularization
  - Modular Services
  - SPM on RTOS
- Remote call for service
  - openAMP & eRPC
  - Accessing secure service
- Future plan
- Reference

Overview

- Multiple Core based
  - Physically isolated
  - IPM (MHU)
- RTOS adapting
  - Secure services
  - SPM implementation
- IPC
  - Asynchronous access
  - openAMP/ePRC
  - PSA compliance
  - Remote call





TF-M Modularization

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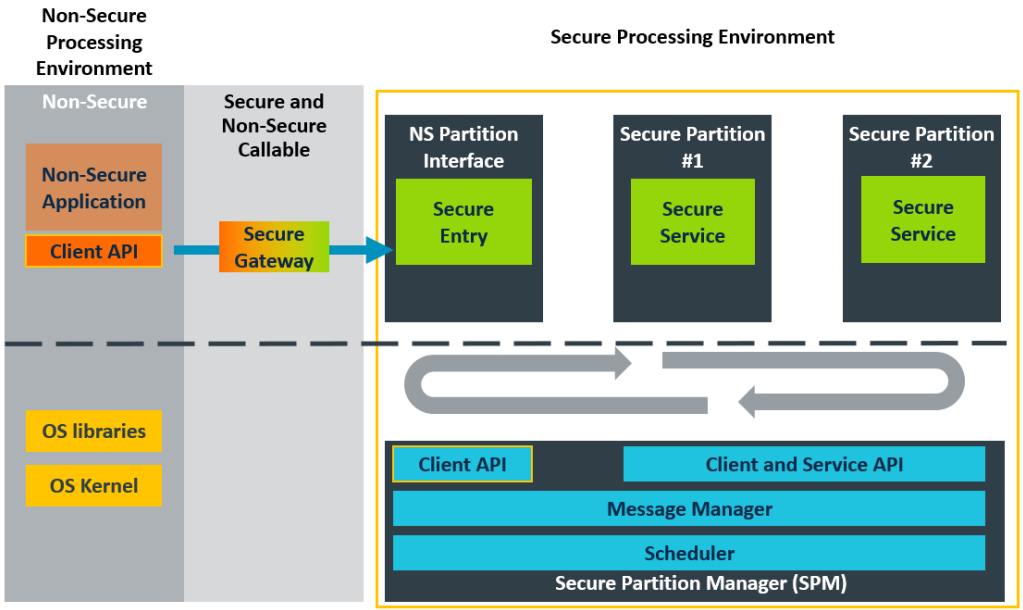
Why TF-M modularization

- Reuse existing secure service in TF-M
  - Typically use TF-M as a whole
- Create your trusted OS quickly
  - PSA FF compatible is recommended

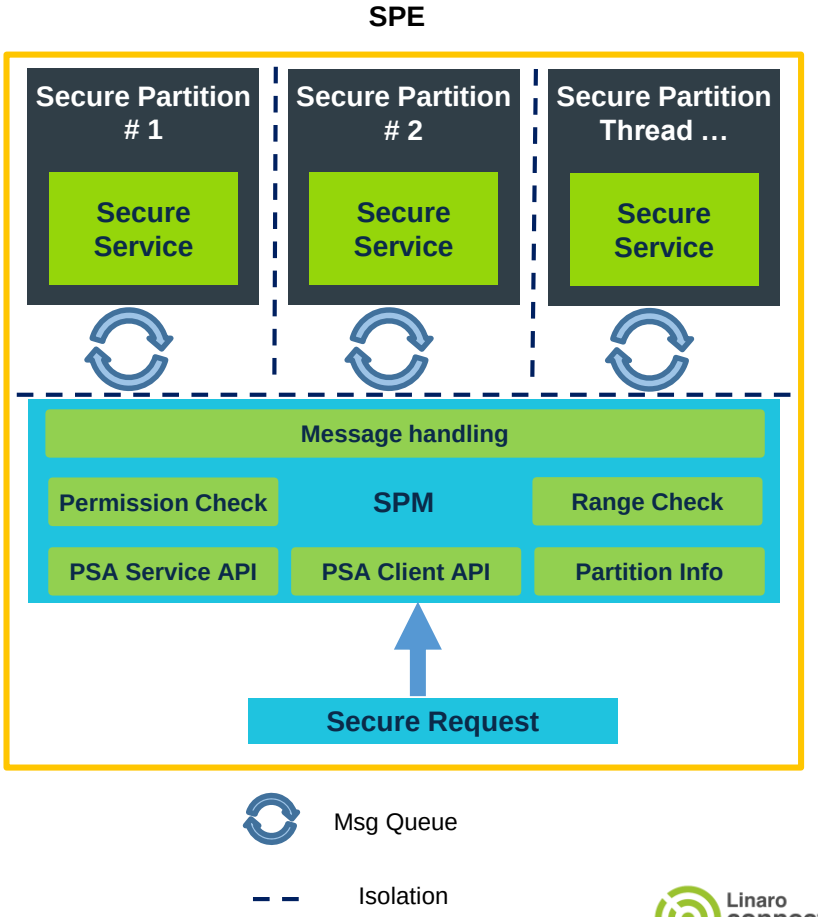
TF-M Modular scope

- Secure partition
  - Standalone lib for each partition
  - PSA APIs
- SPM
  - PSA FF Compliance
  - Manage info and states of SP (Secure Partition)
  - Handle messages to SP
  - Interfaces to IPC, OS kernel



SPM on RTOS

- PSA APIs
- Service serve one request at one time
- Range check based on isolation level
- Asynchronous access
- Ports to OS (MsgQueue/Semaphore)



Remote call for service

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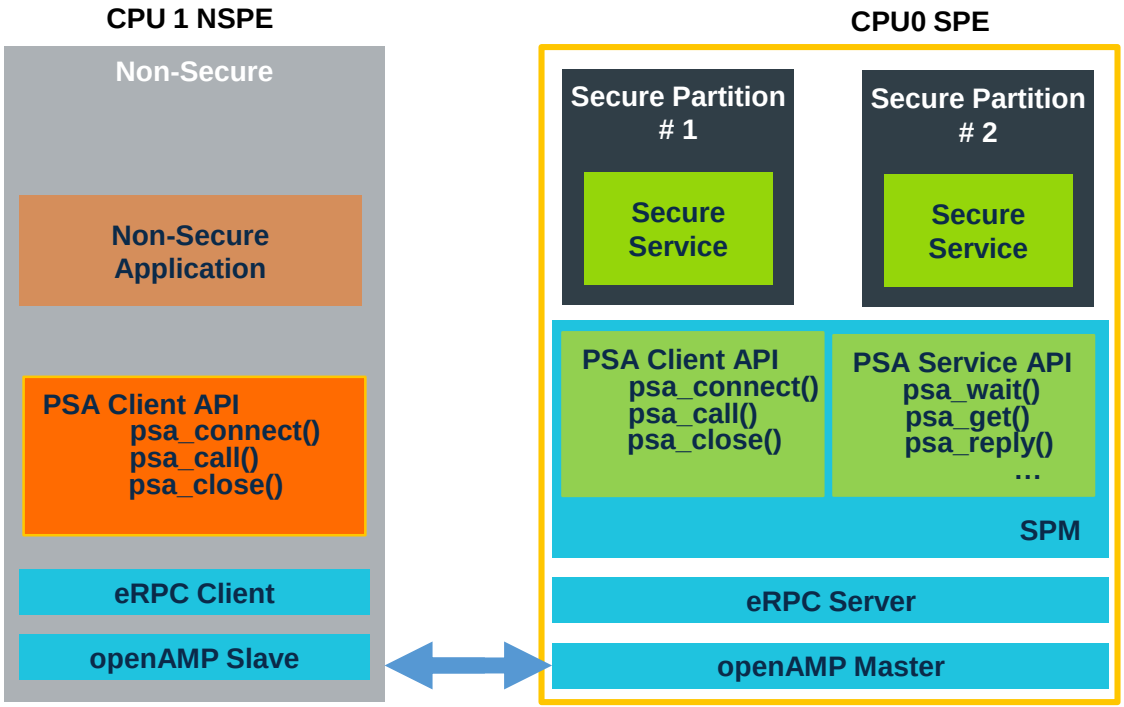
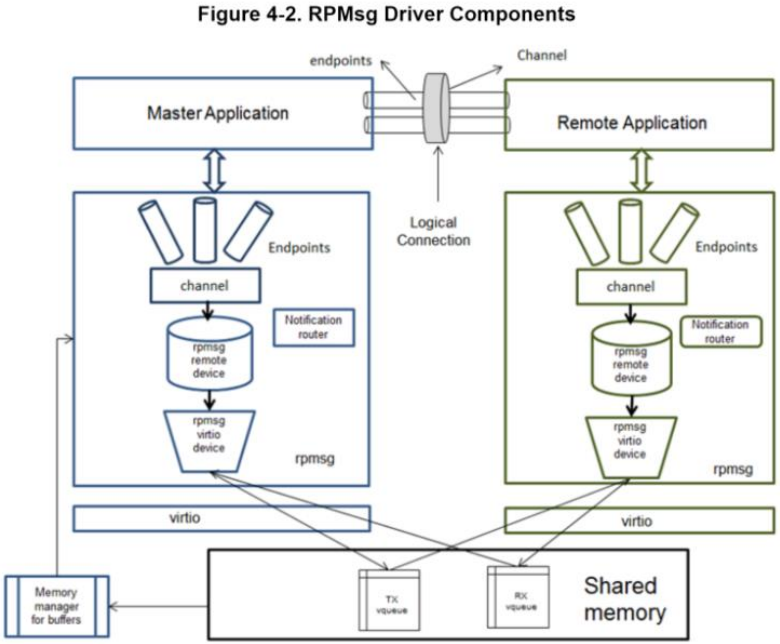
IPC - PSA FF APIs across multiple cores

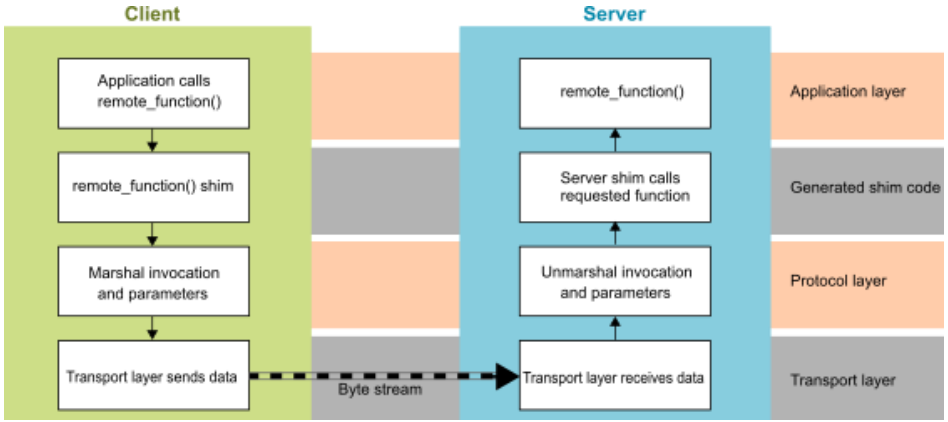
- IPC based on open source project
  - openAMP
  - eRPC
- PSA compliant API
- Asynchronized



openAMP & eRPC

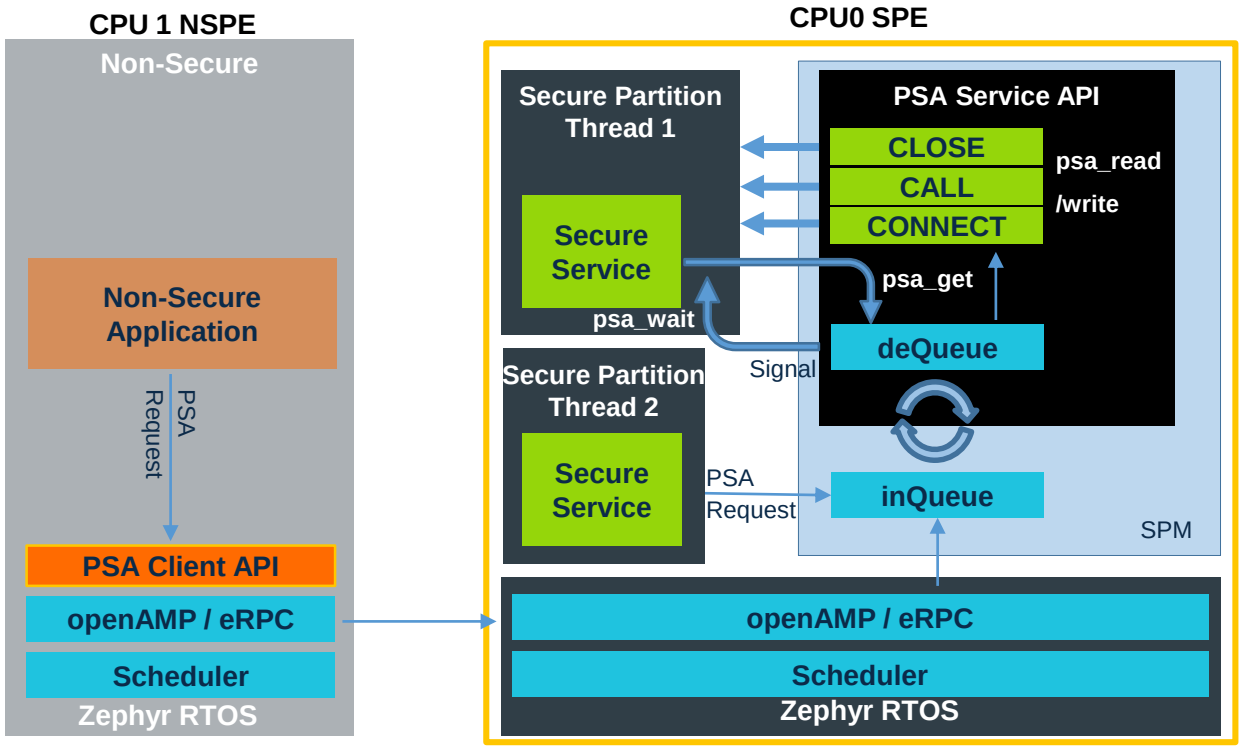


RPMsg in openAMP

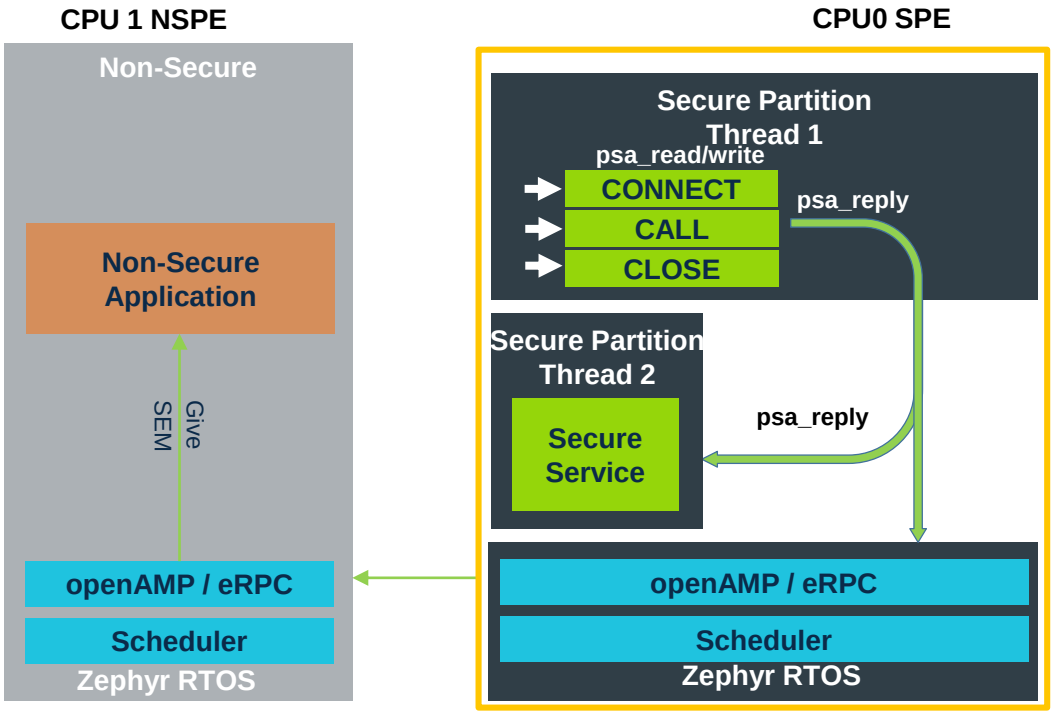


eRPC

Accessing secure service



Secure service reply



Changes in Progress

• Musca Dual-core support in Zephyr	PR 12722
• openAMP and eRPC on Musca	Supported
• IPC (PSA FF) design	Initial version
• SPM modularization	Start

Future Plan

- Multiple entry to secure call
- Isolation 2 and 3 on secure CPU

Ref

- PSA https://pages.arm.com/psa-resources-ff.html
- TF-M https://www.trustedfirmware.org
- TF-M E-mail tf-m@lists.trustedfirmware.org
- OpenAMP https://github.com/OpenAMP
- eRPC https://github.com/EmbeddedRPC/erpc

Thank you

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