Secure Partition Runtime Library on IoT Device

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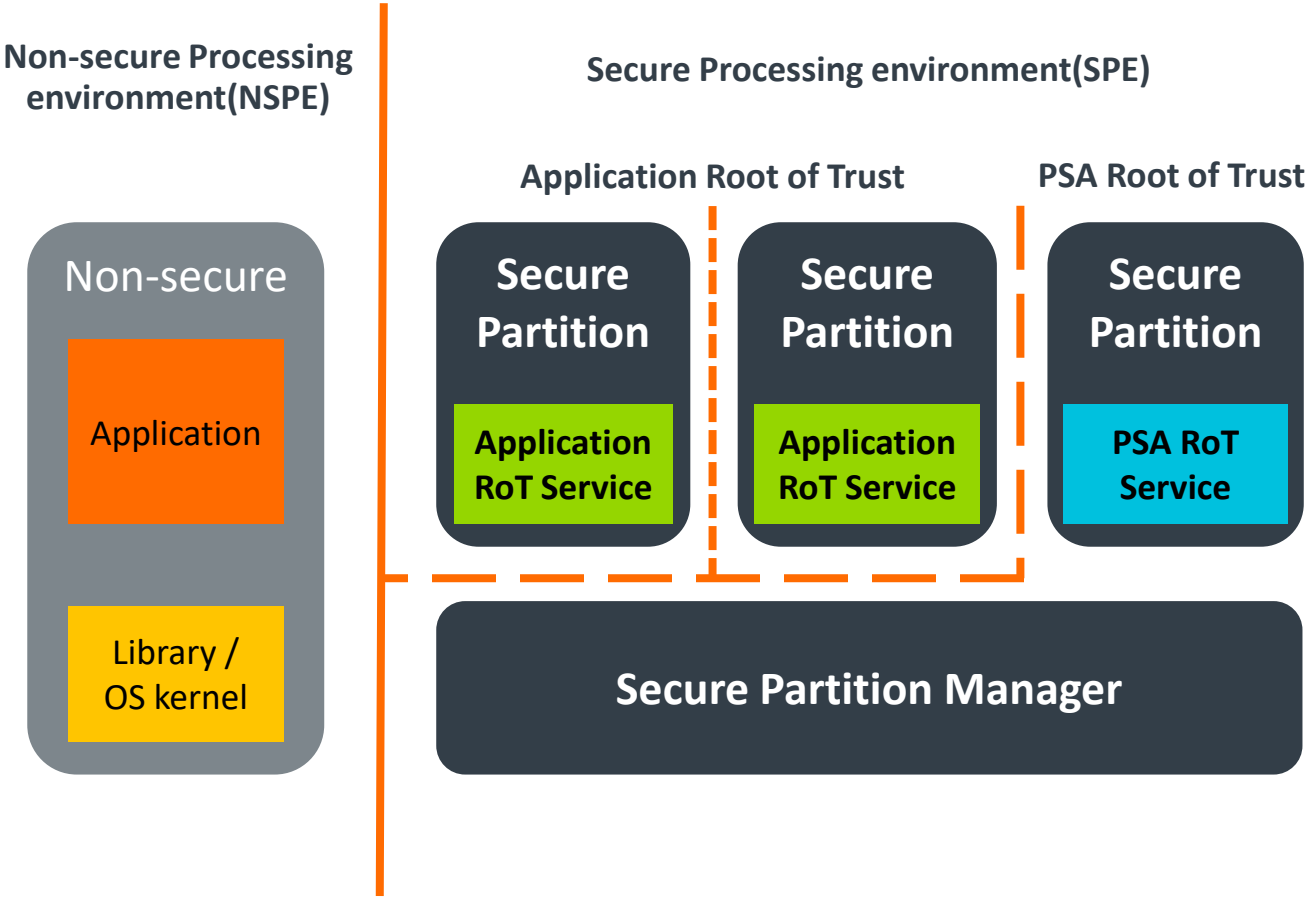
Platform Security Architecture(PSA) Firmware Framework



What is Secure Partition?

- Unit of isolation
- Execution environment for RoT service:
  - Provide access to resources
  - Protect code and data
  - Mechanisms to interact with other components

Isolation level 1 - Protect SPE from NSPE

Isolation level 2 - Protect PSA RoT from App RoT

Isolation level 3 - Protect each Secure partition from other secure partition

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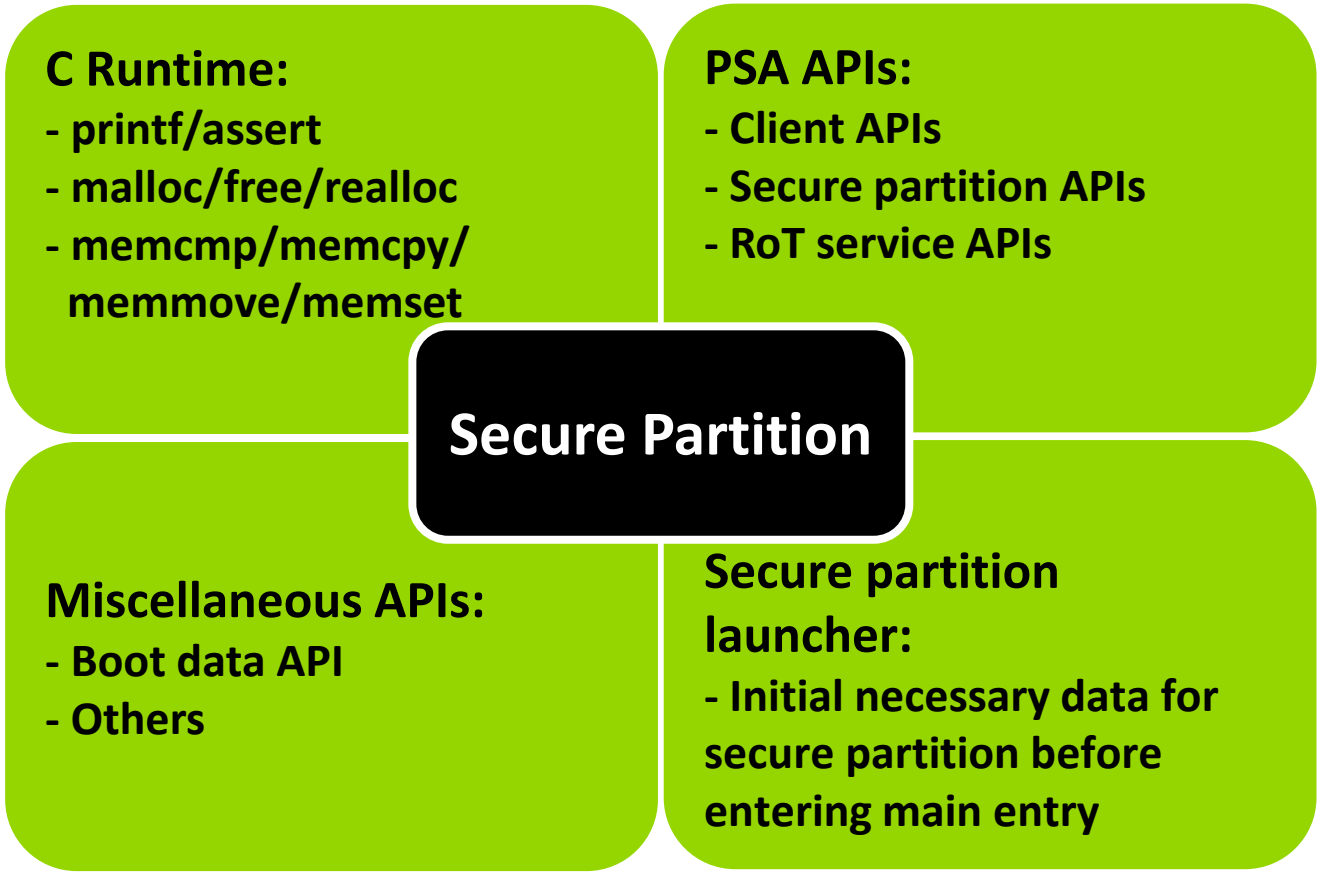
What is in Secure Partition Runtime Library?



- But all these APIs MUST be implemented with security consideration.
- What is requested in PSA FF:

  Only Code is executable

  Only private data is writable

  Private data must be isolated

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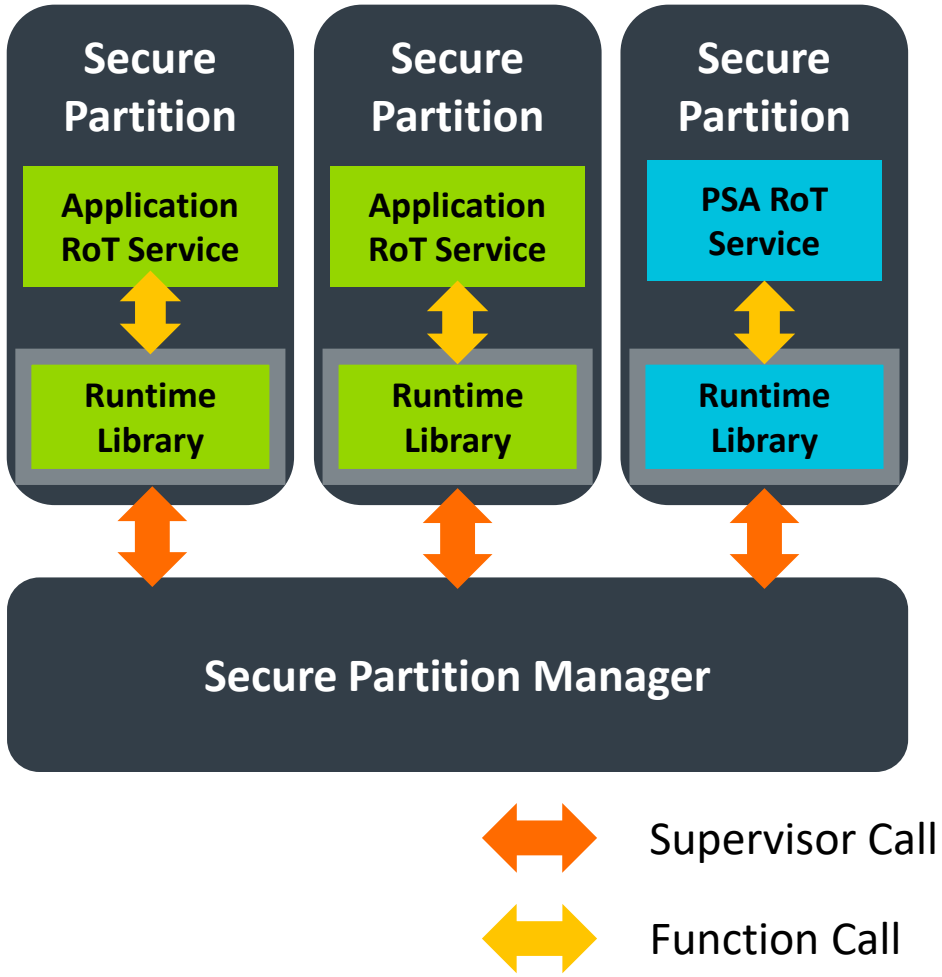
Placement of the Secure Partition Runtime Library

Option 1: Per-Partition Library



- Image size increases much.
- Hard to put into a single loaded Image.

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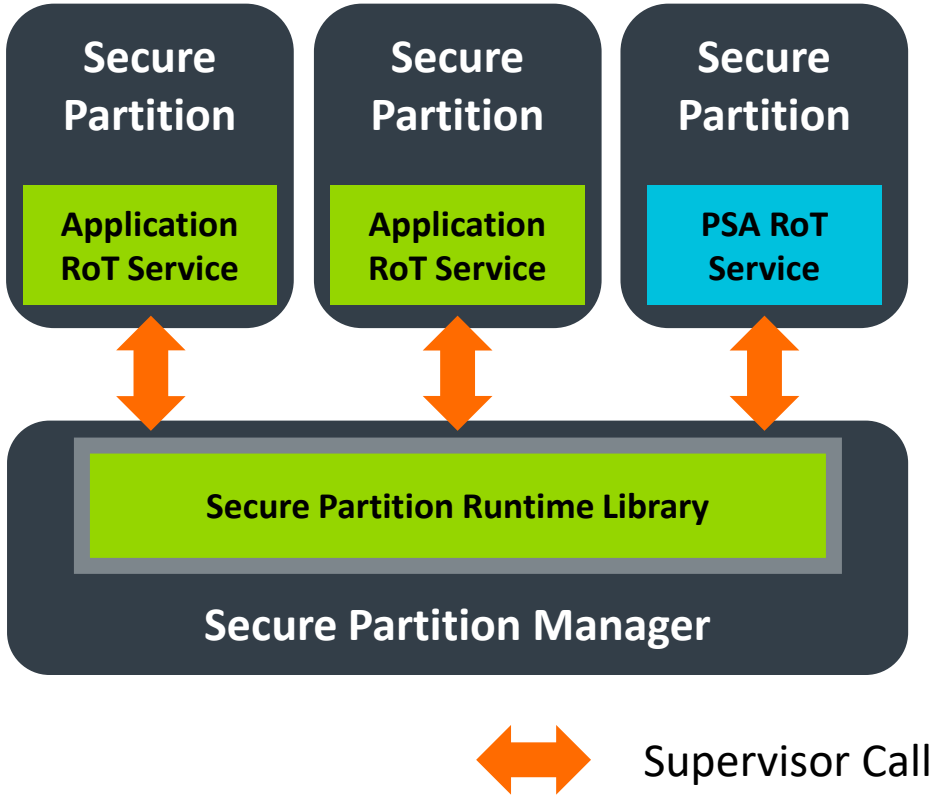
Placement of the Secure Partition Runtime Library

Option 2: All by Supervisor Call



- SPM consume more execution time.
- Library execution cannot be preempted.
- Library code runs under unnecessary privileged level.

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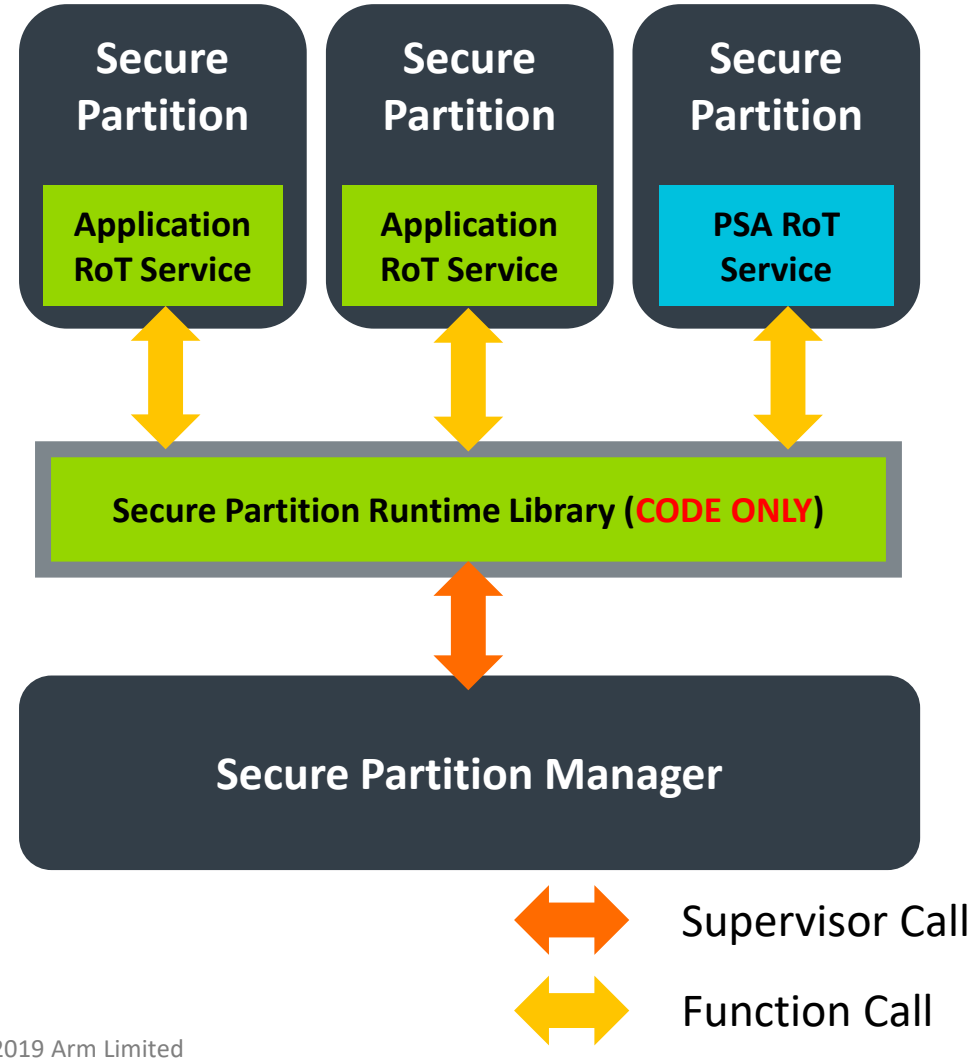
Placement of the Secure Partition Runtime Library

Option 3: Partition Shared Library



- Fast and efficient.
- Dedicated MPU region needs to be reserved for library.
- A well-balanced implementation.
- THIS IS IT.

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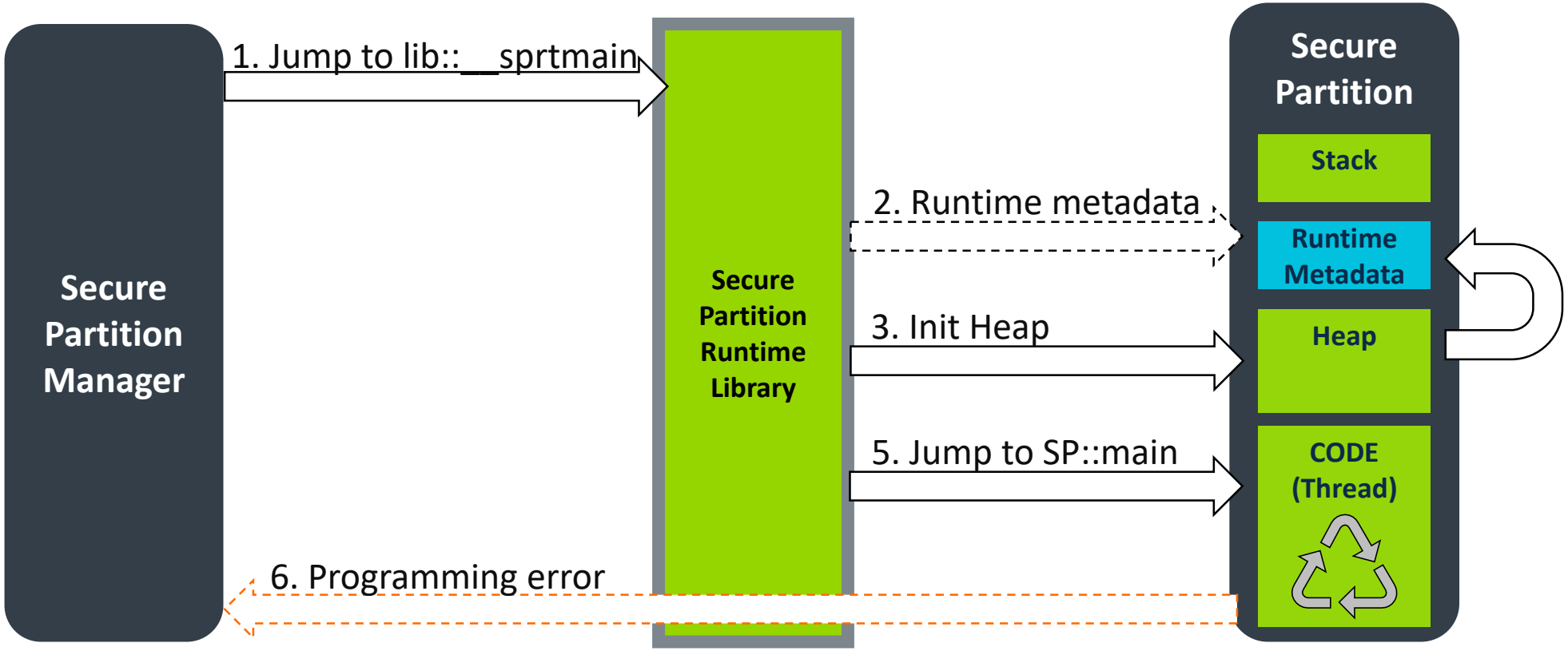
Launch Partitions with Secure Partition Runtime Library



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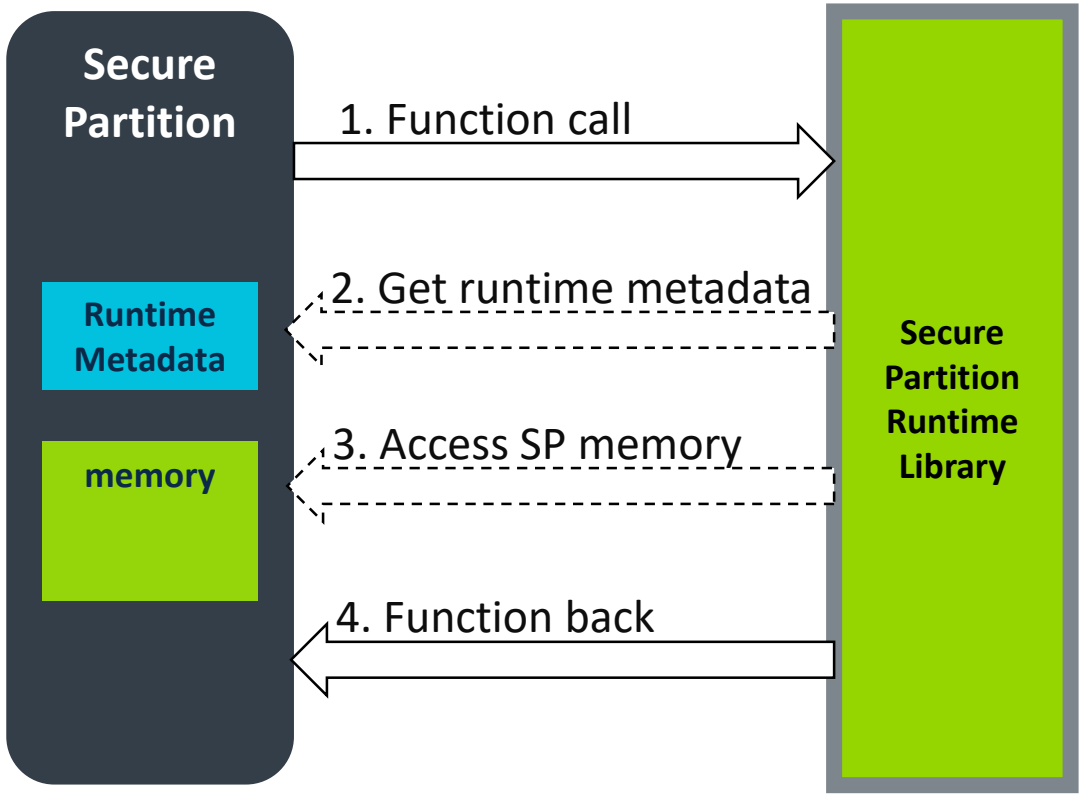
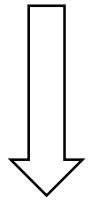
Function call to Secure Partition Runtime Library



Function with Implied Parameters Passing:

void *malloc(size_t sz)



void *_malloc_impl(size_t sz, void *p_inst)

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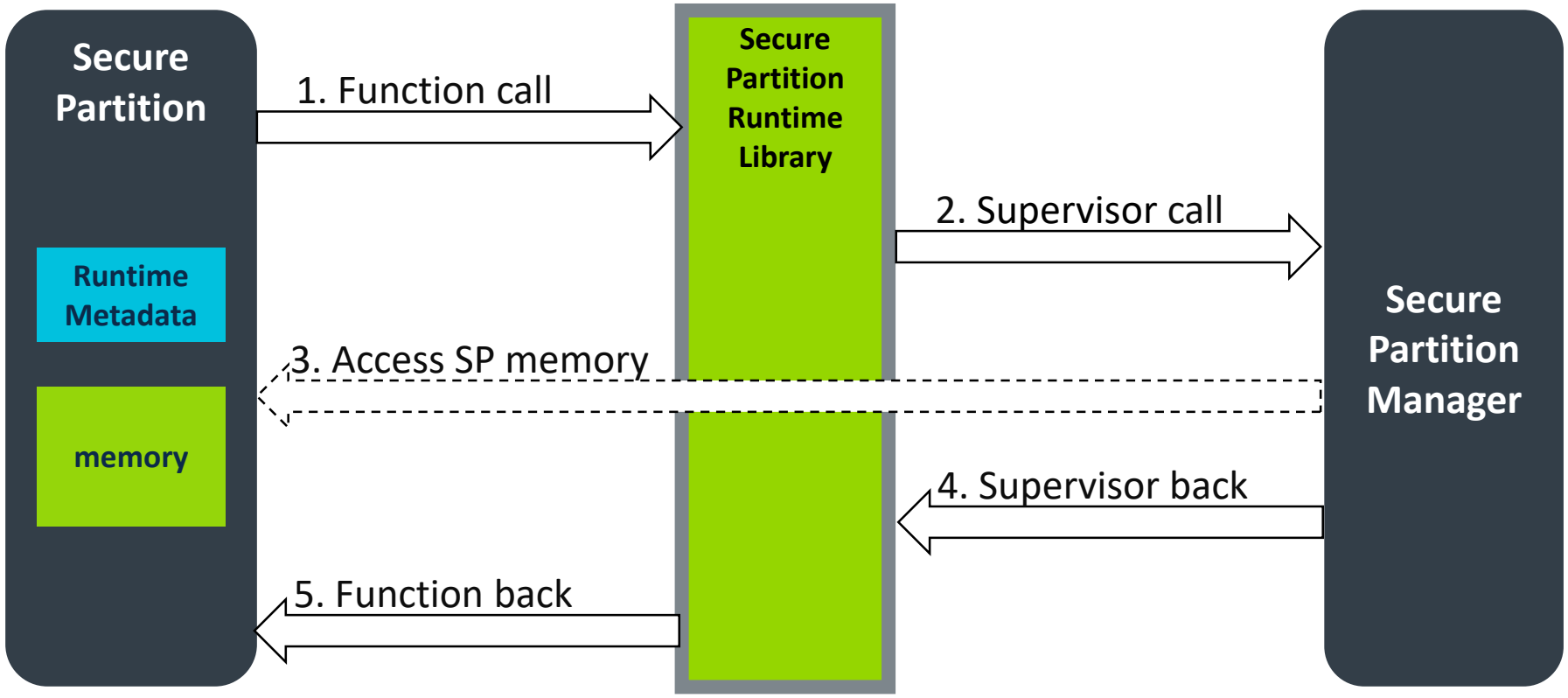
Supervisor Call of Secure Partition Runtime Library



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Project Status

- Secure Partition Runtime Library Design had been public: https://git.trustedfirmware.org/trusted-firmware-m.git/tree/docs/design_documents/tfm_secure_partition_runtime_library.rst

- Secure Partition Runtime Library APIs status
  - PSA FF APIs – 60%
  - C Runtime – 30%
  - Secure Partition launcher – 10%
  - Miscellaneous APIs – 30%

- TF-M Source code: https://git.trustedfirmware.org/trusted-firmware-m.git/

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Q & A

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