Standard FW update on A-class Arm devices

Linaro Virtual Connect 2021

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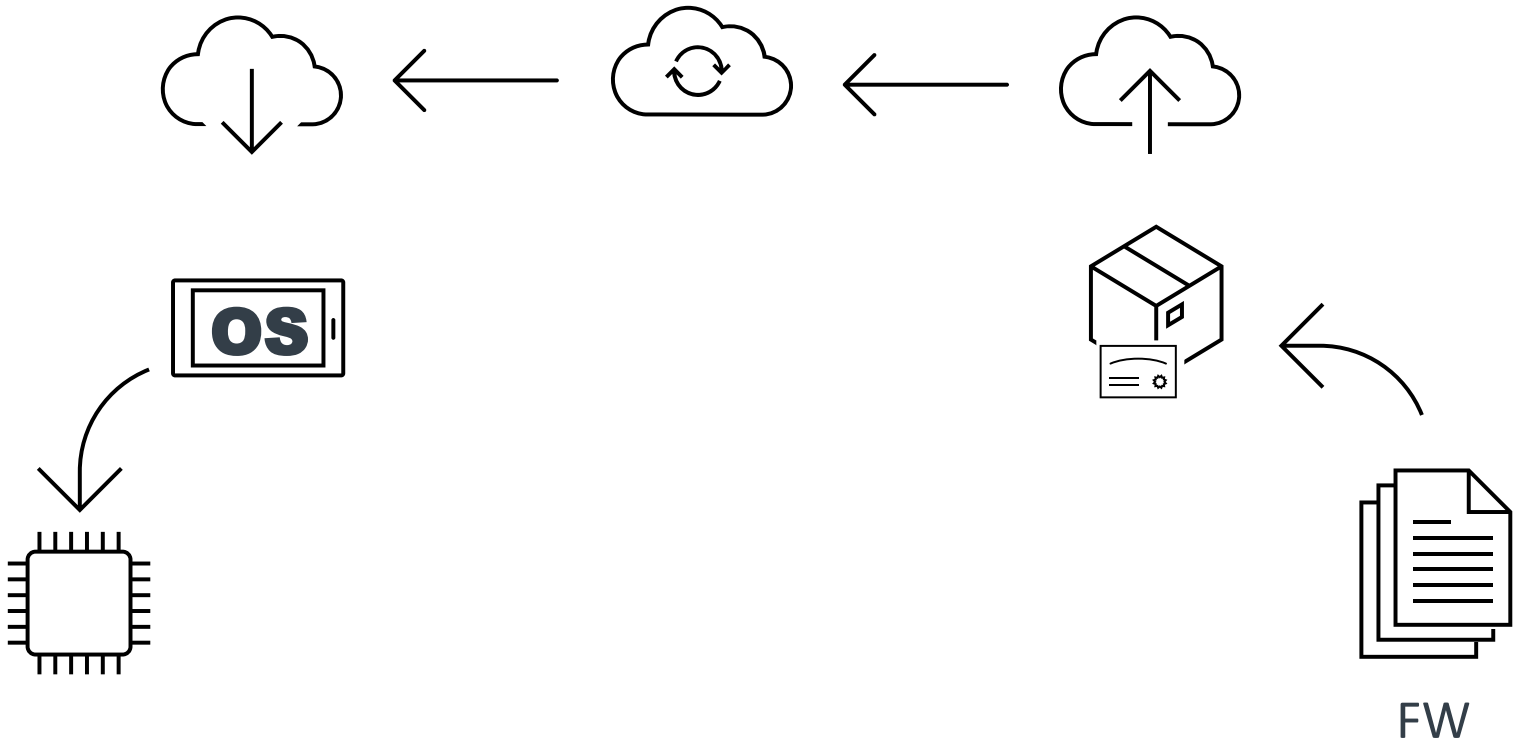
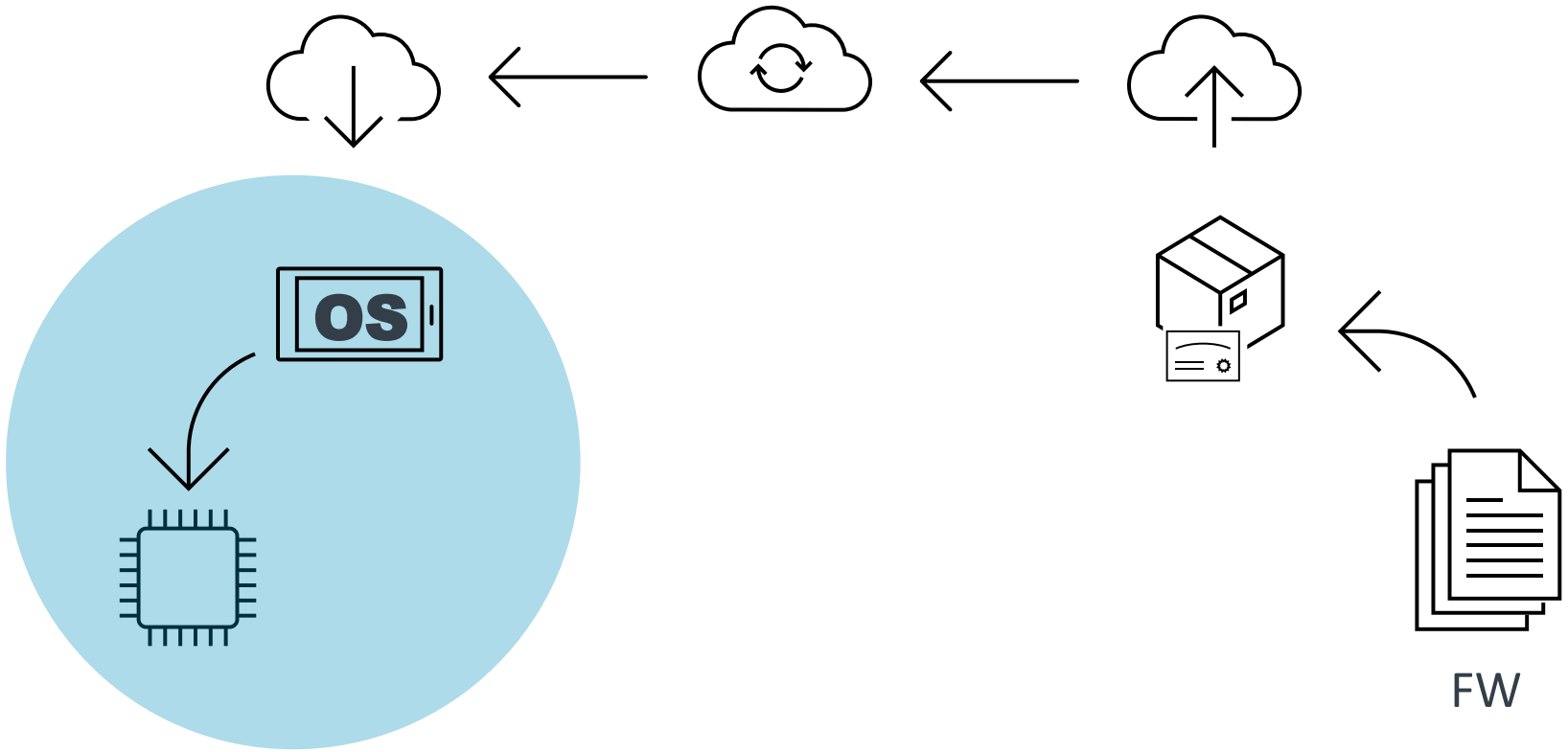
FW delivery hinges on many technologies



FW delivery hinges on many technologies



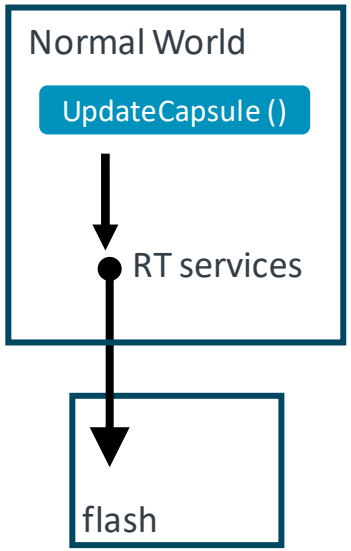
Terminology clarification

- UEFI → industry standard [1]
  - Defines an API
- UEFI implementation: EDK2, U-boot, etc …
  - Implementations of the standard UEFI API
- In this presentation: the term UEFI implementation refers to both U-boot and EDK2.

[1] https://uefi.org/sites/default/files/resources/UEFI Spec 2.8B May 2020.pdf

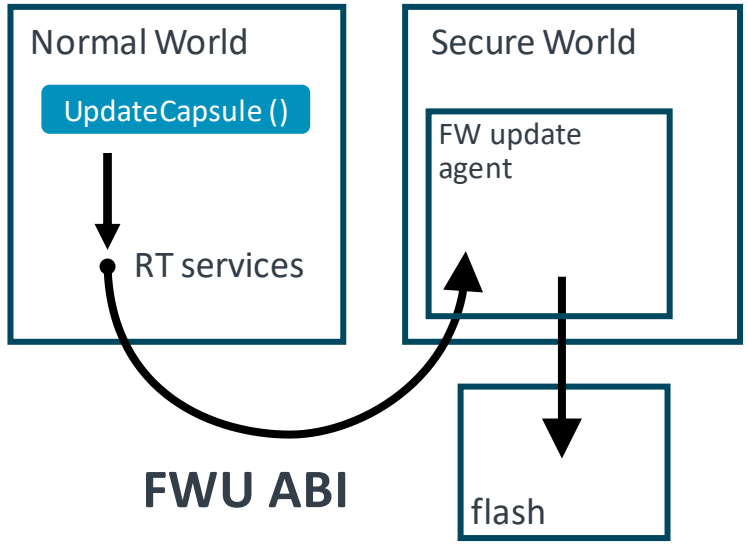
Support diverse platform designs

1



- Lower cost
- More resets
- Open to DoS attacks

2 **Primary scenario**



- Emerging trend
- Dedicated flash for Secure World
- Single reset update
- Reduced system downtime

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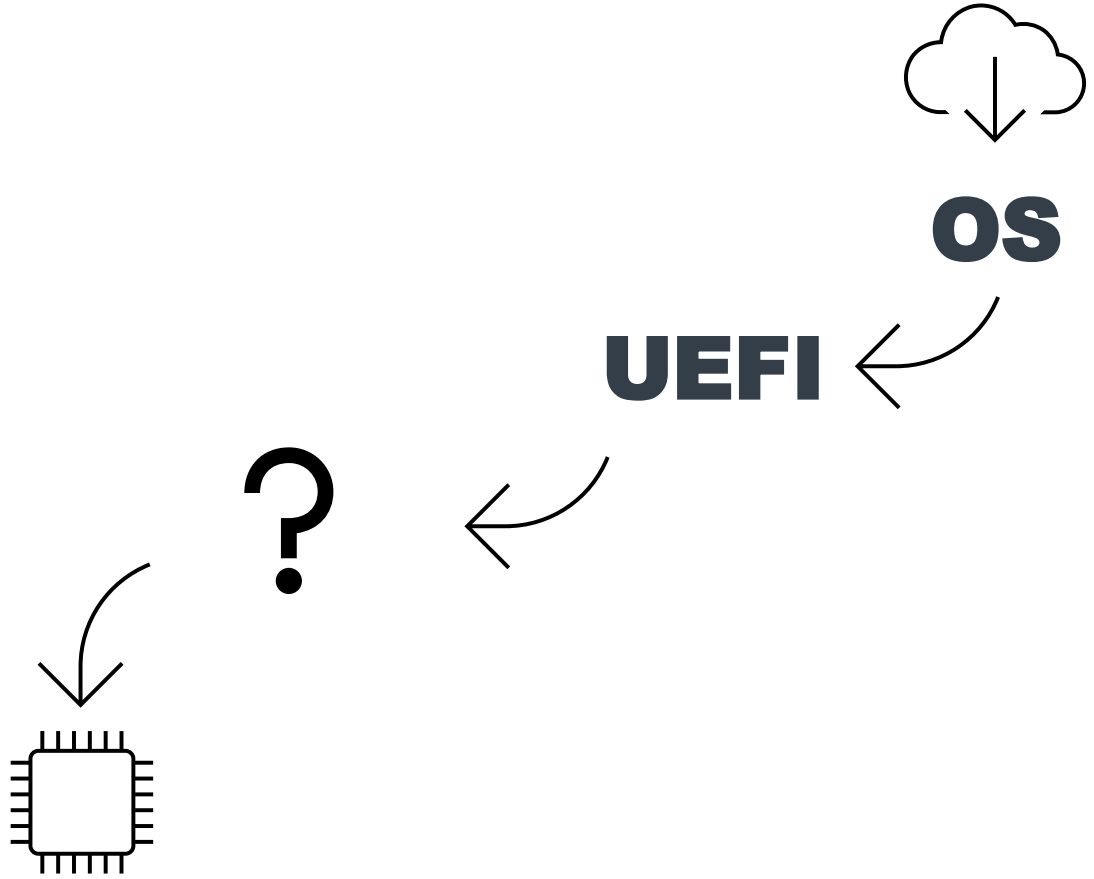
Opportunities for standardization

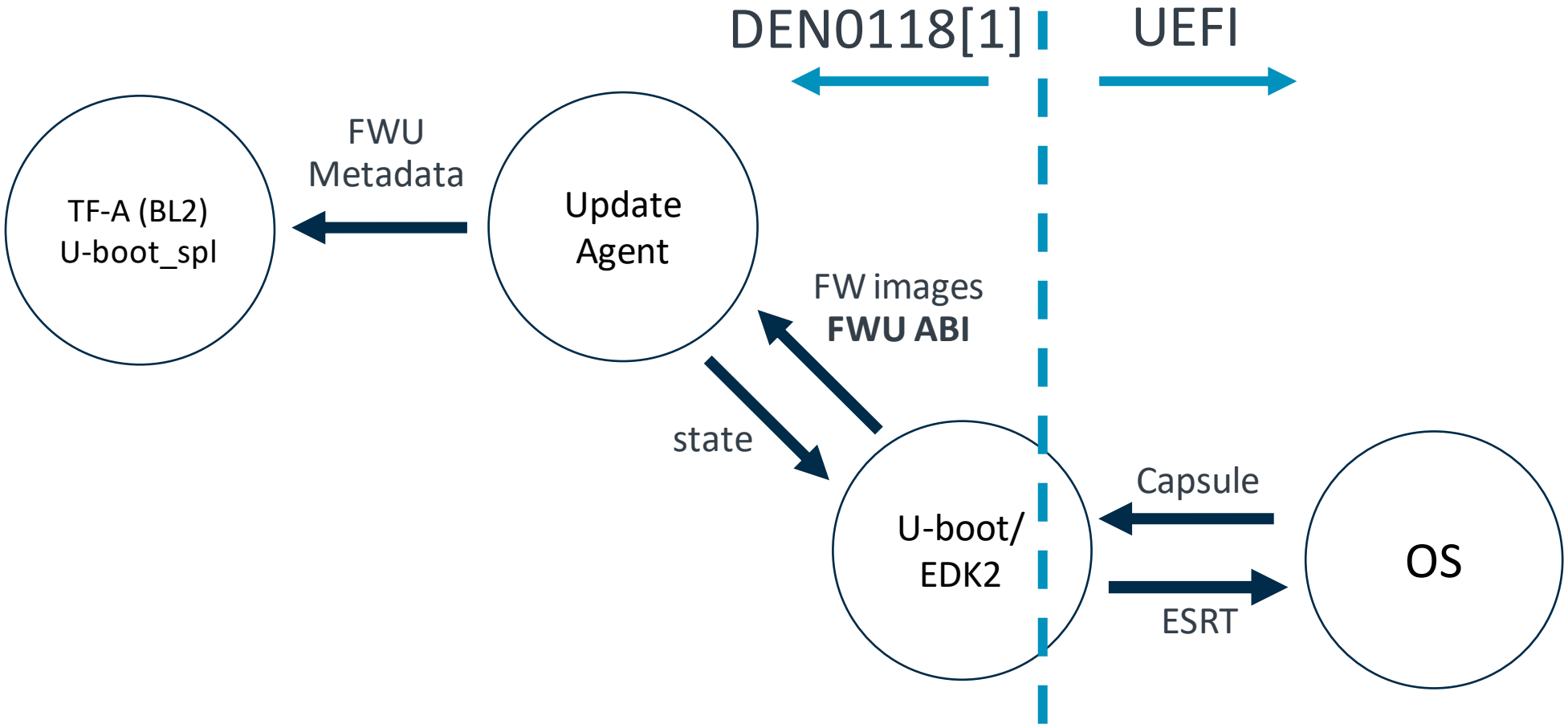
FW update? There's a standard for that!

- (UEFI) UpdateCapsule well established.

- What's missing?
  - Solutions for Interoperability.
    1. FW image communication to Secure World.
  - State info exchange with platform boot code.
    2. Standard A/B bank support

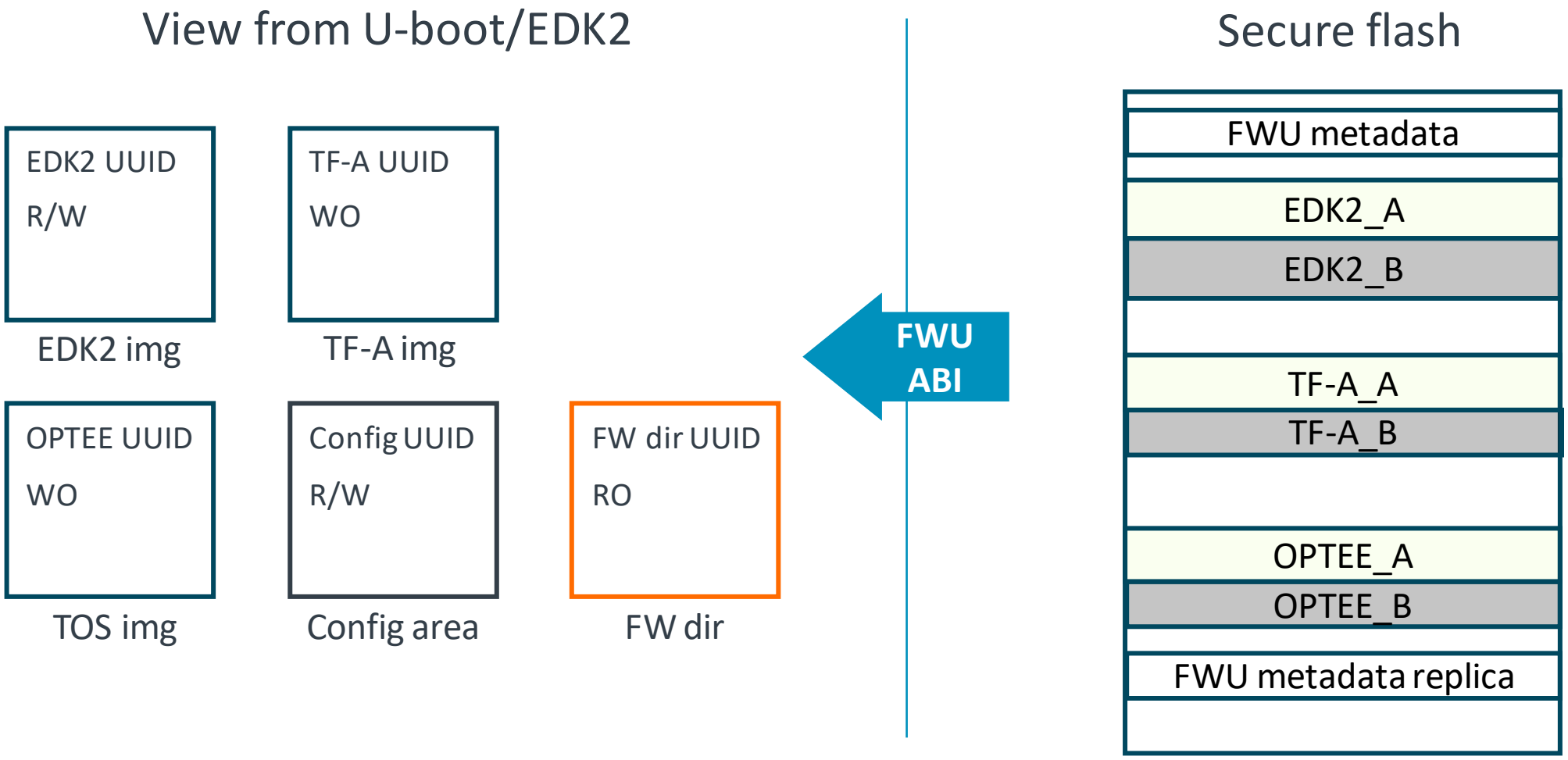


Interfaces between agents are standardized



[1] https://developer.arm.com/-/media/Files/pdf/PlatformSecurityArchitecture/Architect/FWU-PSA-A_DEN0118_1.0ALP2.pdf

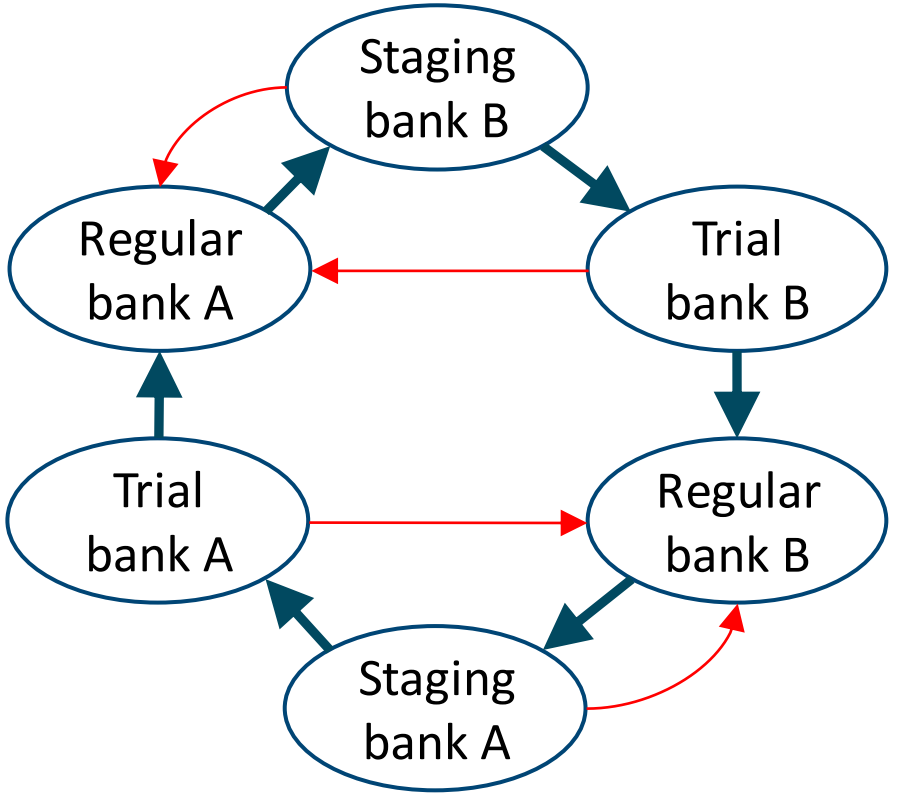
Updata Agent exposes a file abstraction



A-class standard ABI – transfers blobs and navigates FSM

A-class FWU ABI:

- fwu_discover
- fwu_begin_staging
- fwu_end_staging
- fwu_cancel_staging
- fwu_open
- fwu_write_stream
- fwu_read_stream
- fwu_close
- fwu_accept_image
- fwu_set_active



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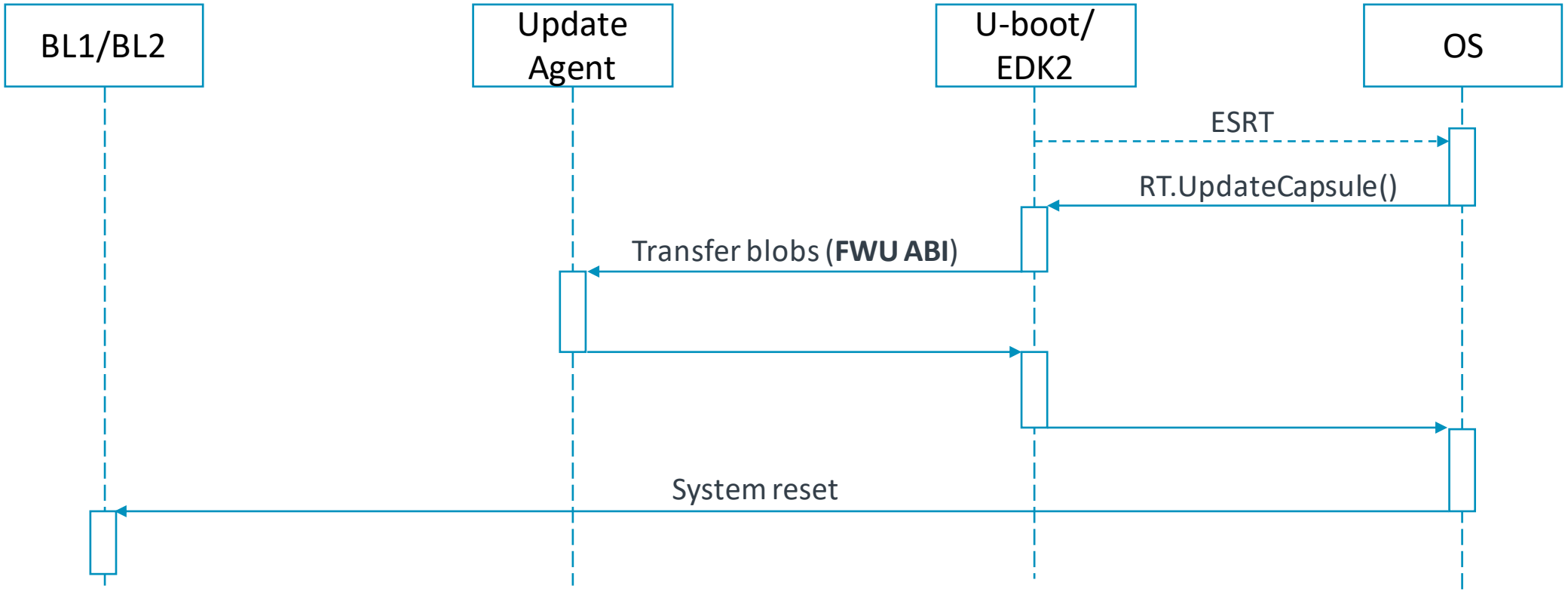
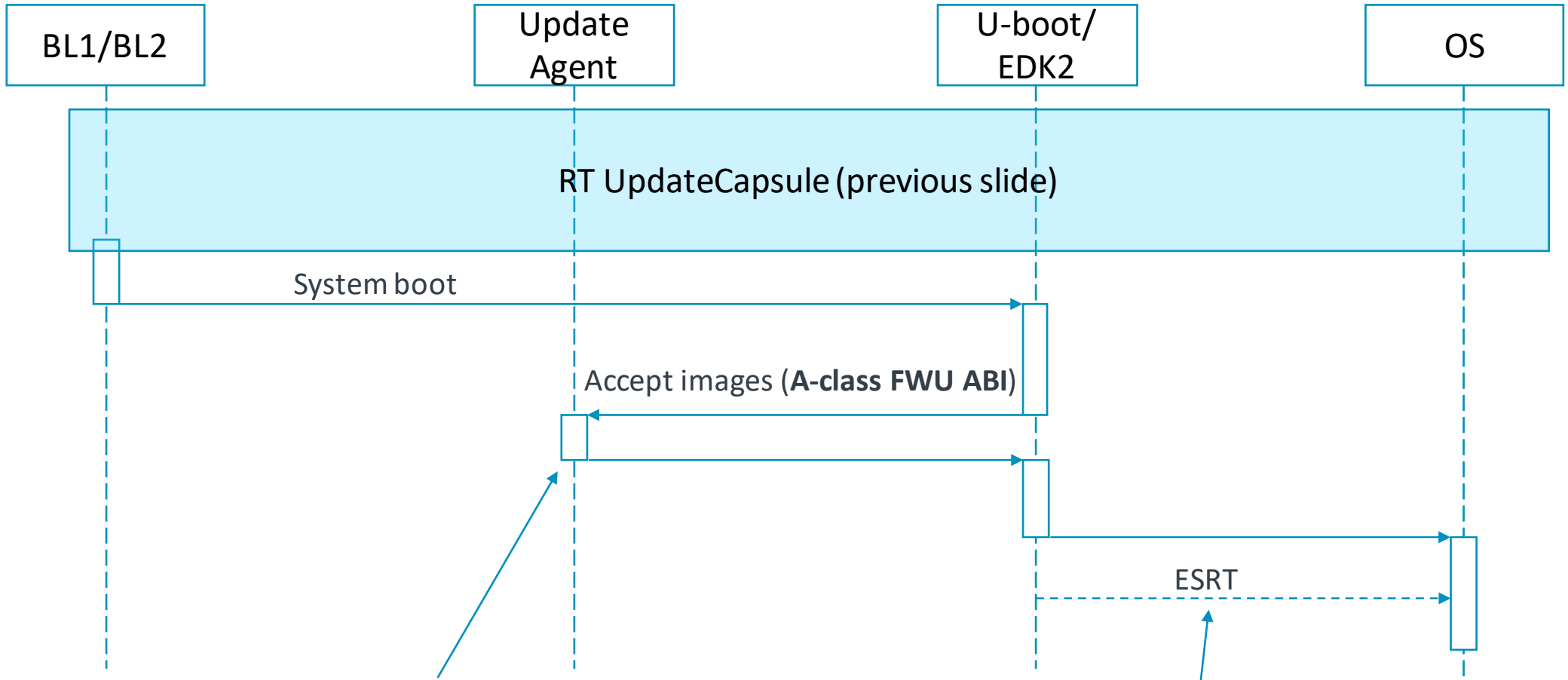
UEFI **Runtime** capsule update



UEFI Trial boot



Project status

QEMU prototype [2]

1. StandaloneMM (EDK2)
2. OP-TEE
3. U-boot
4. TF-A

Ongoing upstreaming to U-boot

UEFI design Document (under development)

Firmware update protocol Alpha [1]

[1] https://developer.arm.com/-/media/Files/pdf/PlatformSecurityArchitecture/Architect/FWU-PSA-A_DEN0118_1.0ALP2.pdf

[2] https://github.com/jmarinho/u-boot-manifest -m fwu_proto.xml

Feedback welcome!

- Specification (Alpha version): https://developer.arm.com/-/media/Files/pdf/PlatformSecurityArchitecture/Architect/FWU-PSA-A_DEN0118_1.0ALP2.pdf

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