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Microsoft

Using SPDM in UEFI for Device Attestation

UEFI Fall 2023 Developers Conference & Plugfest

October 9-12, 2023

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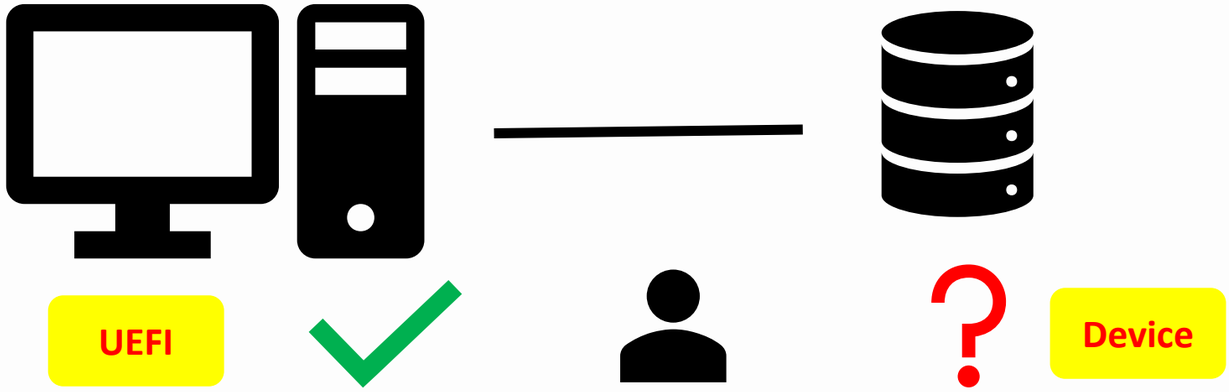
Agenda

- Problem Statement
- Solution – SPDM
  - DMTF
  - UEFI
  - TCG
- EDKII - Device Security POC
- Surface Experience
- Demo

Problem Statement

- During System Boot:
  - How I know the **attached devices** on the platform are trusted?

- After System Boot:
  - How I know the system booted with the **known good devices**?



How to extend the trust from the platform to the devices?

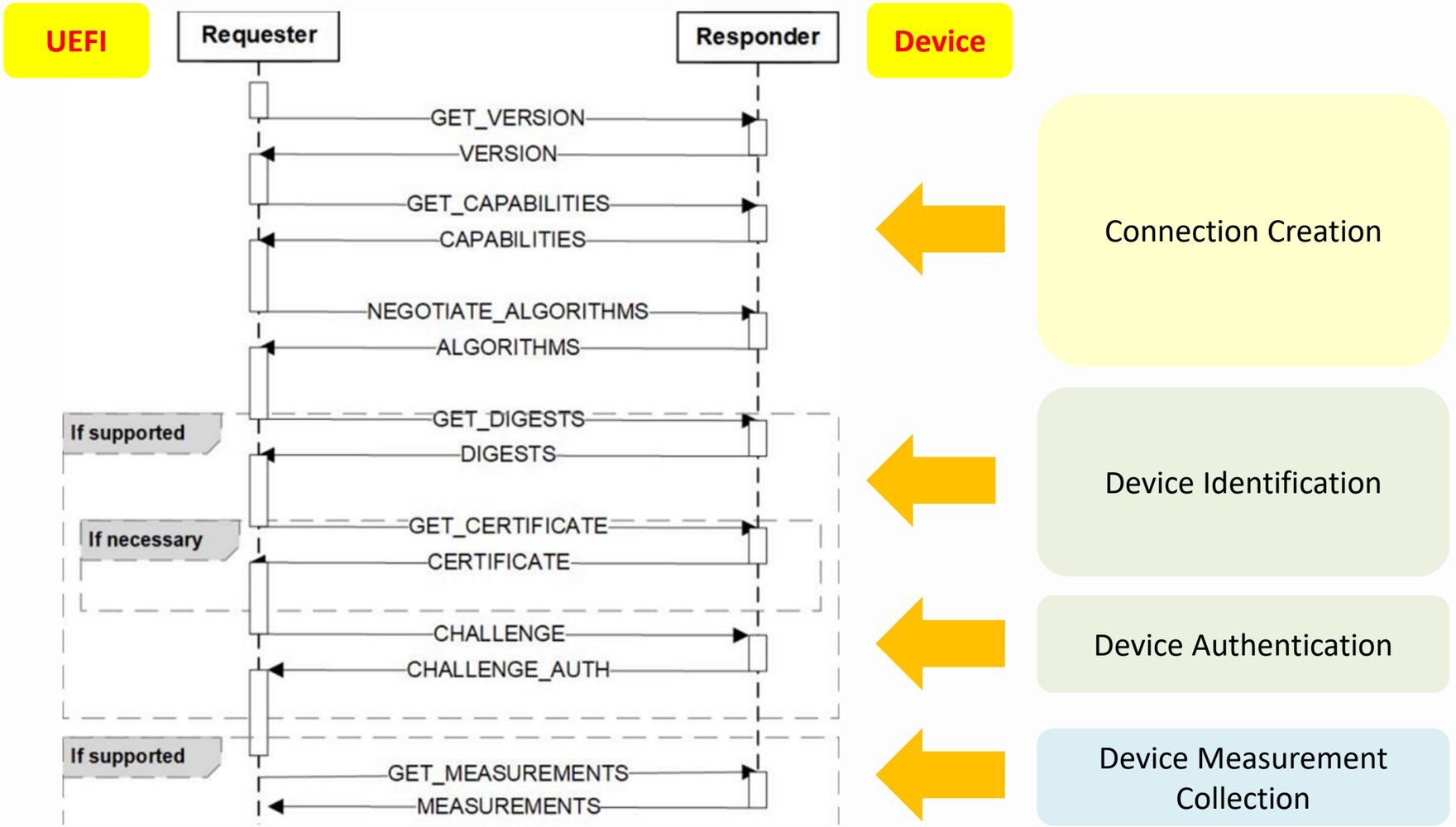
Solution

Specification – SPDM

- Security Protocol and Data Model – from DMTF
  - SPDM 1.0 (2019): **device authentication and measurement collection**.
  - SPDM 1.1 (2020): secure session, mutual authentication.
  - SPDM 1.2 (2021): alias certificate, certificate provisioning, message chunking.
  - SPDM 1.3 (2023): event notification, measurement extension log, multiple key.

Source: https://www.dmtf.org/sites/default/files/SPDM_1.3_and_Beyond_2023-08.pdf

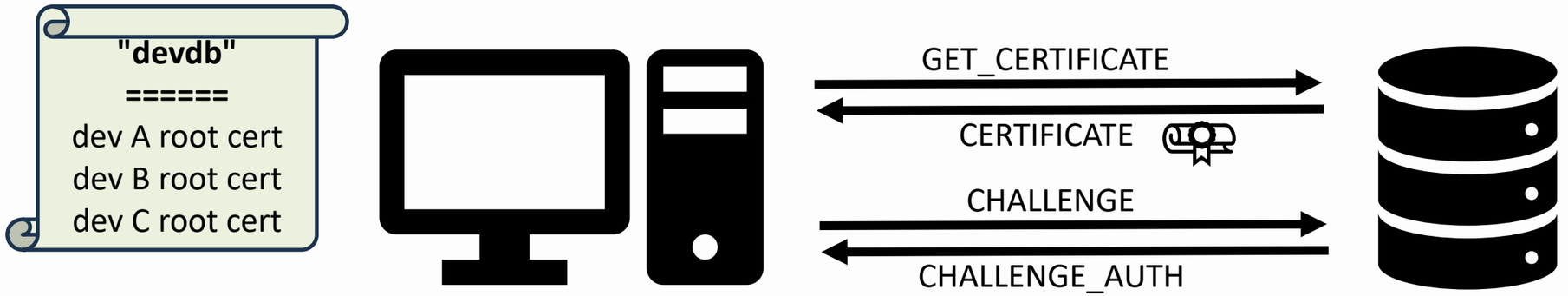
SPDM attestation and authentication



Source: SPDM specification

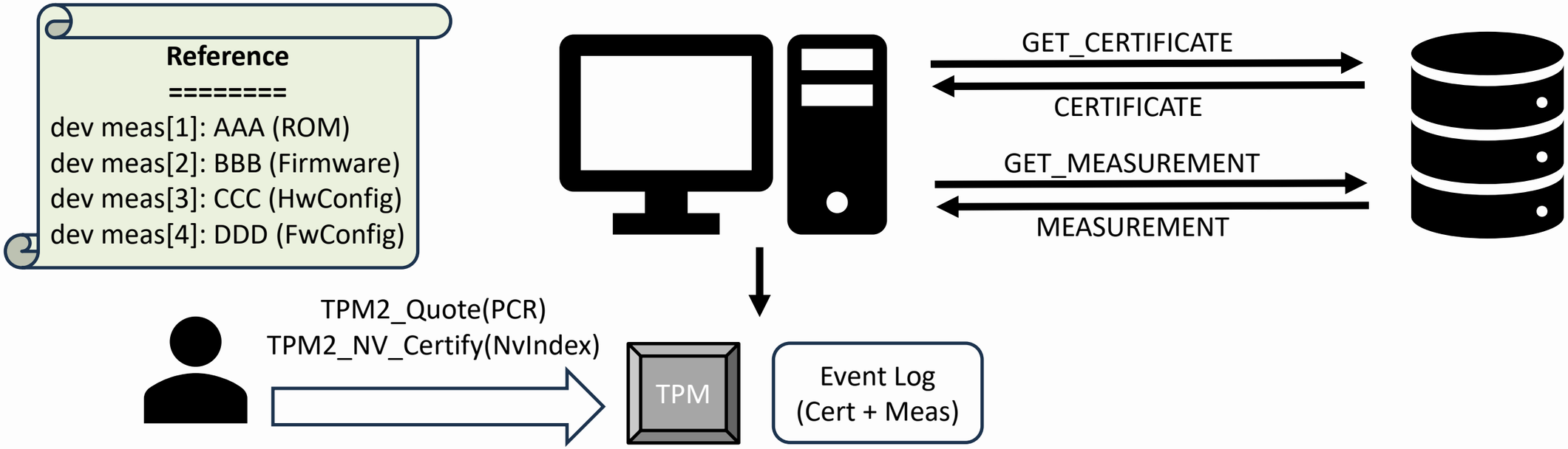
Specification – UEFI

- UEFI 2.10 adds **Device Authentication**.
  - L"devdb": device security database -> device trust anchor
  - L"devAuthBoot": enable/disable device authentication.
  - UEFI may
    - Get device certificate and challenge the device.
    - Check if the device cert is endorsed by the device trust anchor.
    - Ignore/Disable the device in case of failure.



Specification – TCG PC Client PFP

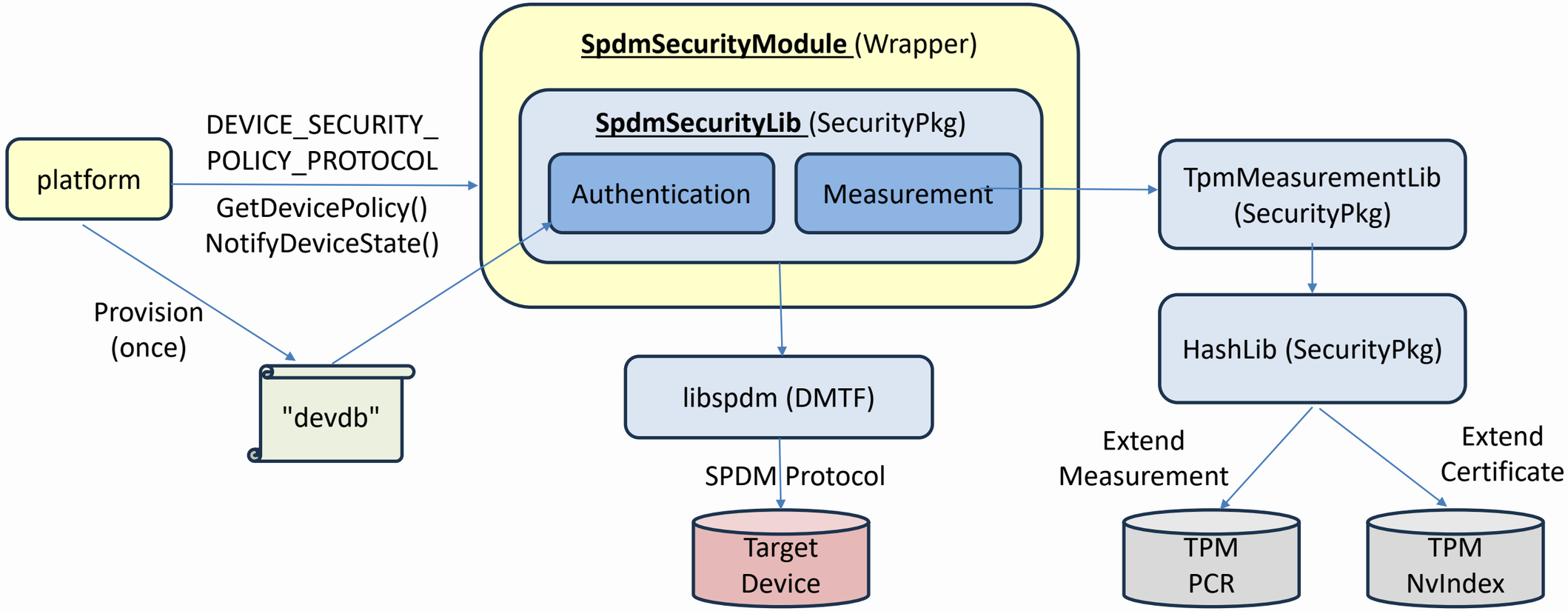
- PC Client PFP 1.06 (draft) adds **device measurement**
  - SPDM Device Measurement => TPM PCR + EventLog (class data)
  - SPDM Device Certificate => TPM NvIndex + EventLog (instance data)
  - SPDM Device Auth Nonce => TPM NvIndex + EventLog (dynamic data)



Implementation POC

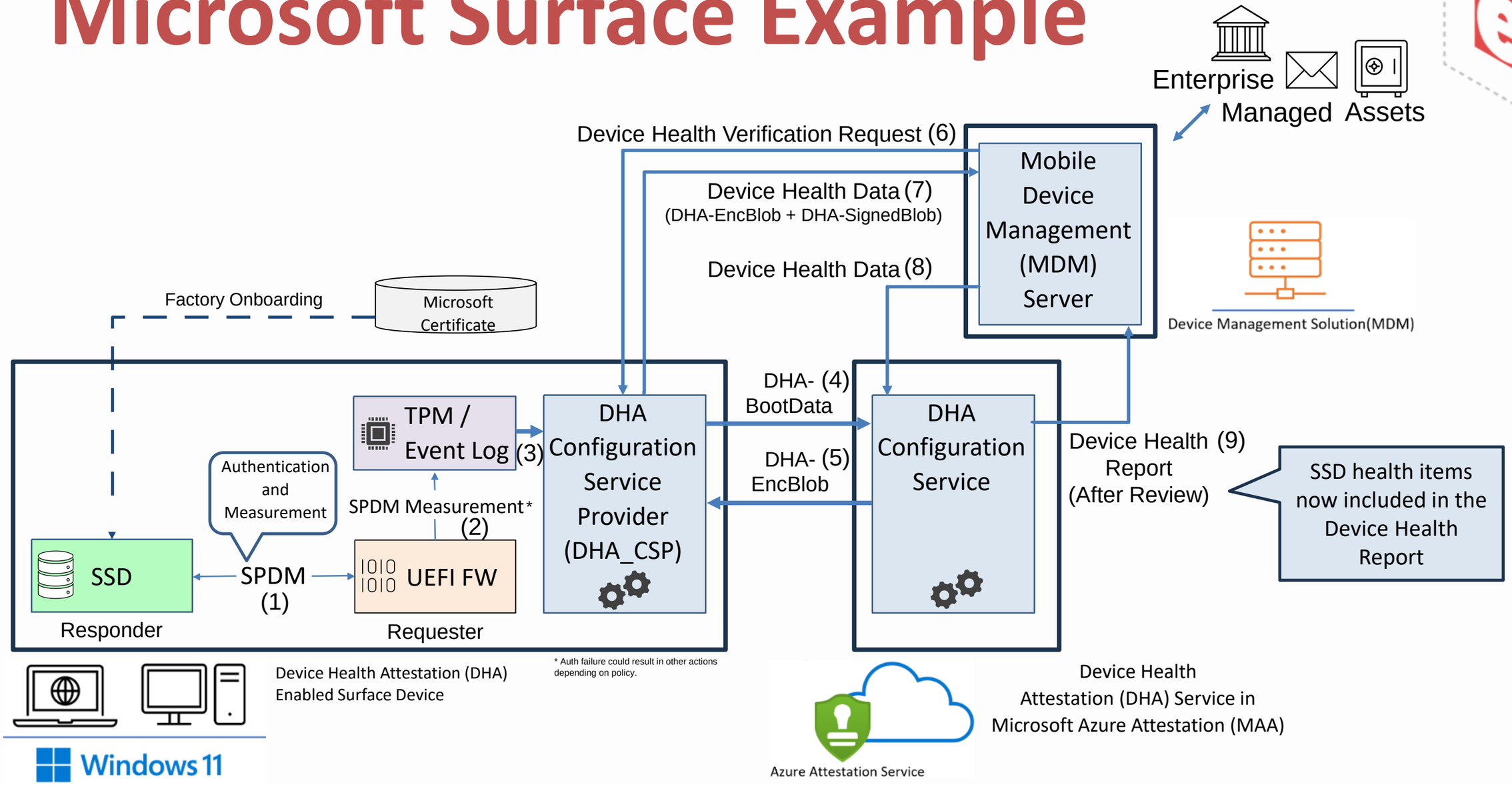
EDKII – Device Security POC

- EDKII Staging – DeviceSecurity Branch



Use Case

Microsoft Surface Example



End-to-end flow called a HealthAttestation session (MAA-Session).

Demo

Reference

- DMTF, SPDM Specification 1.3
  - https://www.dmtf.org/dsp/DSP0274
- UEFI, UEFI Specification 2.10 – Device Authentication
  - https://uefi.org/specs/UEFI/2.10/32_Secure_Boot_and_Driver_Signing.html#device-authentication
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  - https://cfp.osfc.io/osfc2020/talk/ECQ88N/
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- DMTF, SPDM sample implementation and emulator
  - https://github.com/DMTF/libspdm, https://github.com/DMTF/spdm-emu
- EDKII, Device Security POC
  - https://github.com/tianocore/edk2-staging/tree/DeviceSecurity
- Microsoft, Device Health Attestation
  - https://learn.microsoft.com/en-us/windows-server/security/device-health-attestation
  - https://learn.microsoft.com/en-us/windows/client-management/mdm/healthattestation-csp

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