SPDM 1.2 Features

September 1, 2021

Disclaimer

- The information in this presentation represents a snapshot of work in progress within the DMTF.
- This information is subject to change without notice. The standard specifications remain the normative reference for all information.
- For additional information, see the DMTF website.
- This information is a summary of the information that will appear in the specifications. See the specifications for further details.

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SPDM’s Umbrella Goals

- All SPDM features fall into at least one of these main goals:
  - Device Attestation
  - Securing Communication over the Wire
- Device Attestation
  - The ability to attest various aspect of a device such as firmware integrity and device identity.
- Securing Communication over the Wire
  - Provide the transport the ability to secure communication of any data over that transport.

SPDM Summary

- Version 1.0:
  - Measurement Support
  - Device Authentication
- Version 1.1:
  - Secure Session
    - Public Key Exchange
    - Symmetric Key Exchange
  - Mutual Authentication

SPDM 1.2 Feature Additions

- Provisioning
  - Allows installation of device certificate in manufacturing.
- Certificates
  - Allows for alias leaf certificates derived from device certificates.
- Message Fragmentation
  - Send large SPDM messages in chunks.
- Miscellaneous:
  - Added SM2, SM3, SM4 algorithms to supported list.
  - New OIDs added.

SPDM 1.2 Feature Deprecation

- Deprecating Basic Mutual Authentication
  - Removing mutual authentication in CHALLENGE and CHALLENGE_AUTH.

SPDM 1.2 Change Awareness

- Statement of Backwards Compatibility:
    - SPDM message format will maintain bit-wise and semantic compatibility for existing fields.
        - SPDM may append new fields to an existing message.
        - SPDM may make use of reserved values.
        - SPDM may deprecate a valid value.
    - SPDM may make operational changes to fix a security issue or strengthen the security posture of the operation even if they are technically incompatible.

- Therefore, SPDM 1.2 contains changes that may be deemed technically incompatible with prior versions.
    - Please see change notes at the end of DSP0274 1.2 for details.

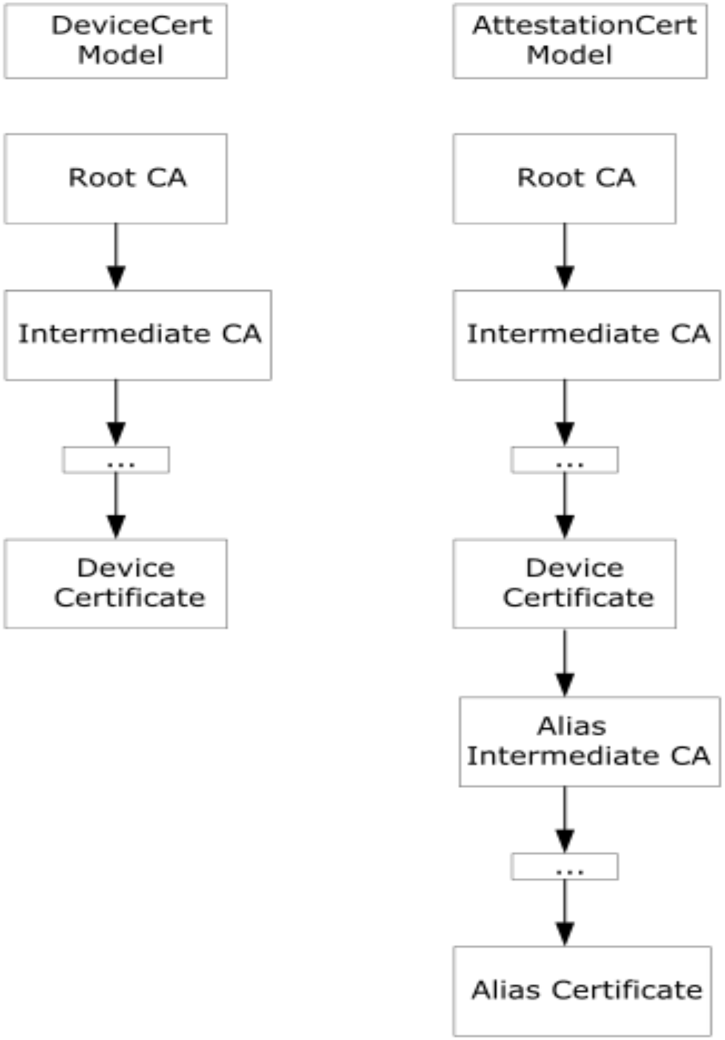
Provisioning

- Allows for a device certificate (i.e., certificate slot 0) to be installed in a secured environment (e.g., manufacturing).
- New Request / Response
  - SET_CERTIFICATE / CERTIFICATE_RSP
    - Installs a certificate chain to the specified slot.
  - GET_CSR / CSR
    - Generates a certificate signing request to be signed by a certificate signing infrastructure.

Alias Certificates Support

- What is an Alias Certificate or Certificate chain?
  - They are dynamically generated, usually, on each device reset.
  - They are chained to the device certificate.
  - They are mutable.
- New Feature
  - Devices can generate alias certificate dynamically usually on device boot.
  - Alias certificates will be used as the leaf certificate instead of device certificates in all existing device authentication flow (i.e., CHALLENGE, KEY_EXCHANGE, GET_MEASUREMENT, etc...).
    - Device Certificates are usually static, immutable and hardware anchored.

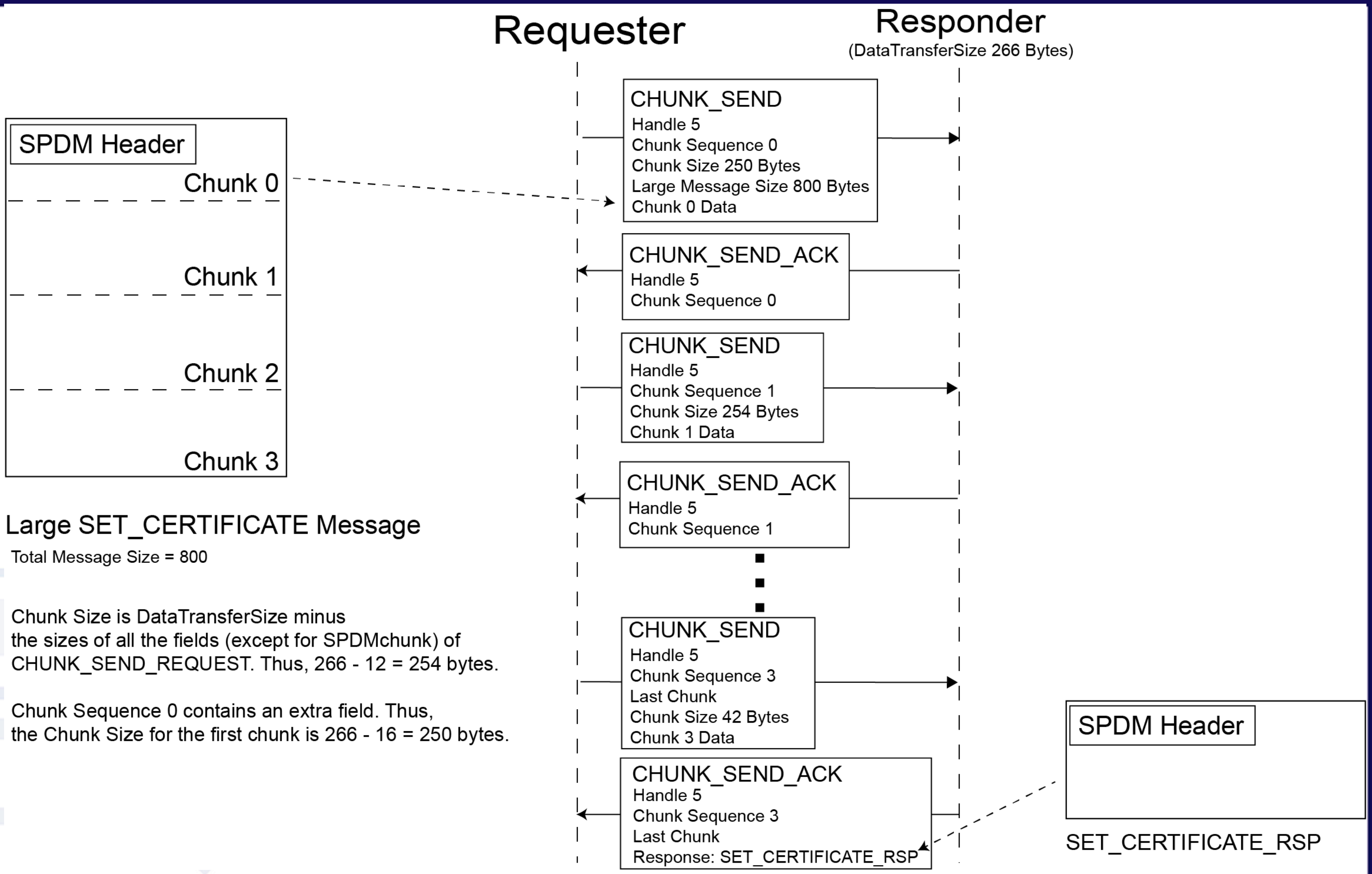
Alias Certificate Illustration



Message Fragmentation – Chunks Transfer

- Allows a large SPDM message to be transfer in fragments (called chunks) to account for the receiving buffer size.
- New Request / Response:
  - CHUNK_SEND / CHUNK_SEND_ACK
    - Send a large SPDM Request in fragments.
  - CHUNK_GET / CHUNK_RESPONSE
    - Retrieves a large SPDM Response in fragments

Send Large SPDM Request Flow



Requester

Responder
(DataTransferSize 266 Bytes)

SPDM Header
Chunk 0
Chunk 1
Chunk 2
Chunk 3

CHUNK_SEND
Handle 5
Chunk Sequence 0
Chunk Size 250 Bytes
Large Message Size 800 Bytes
Chunk 0 Data

CHUNK_SEND_ACK
Handle 5
Chunk Sequence 0

CHUNK_SEND
Handle 5
Chunk Sequence 1
Chunk Size 254 Bytes
Chunk 1 Data

CHUNK_SEND_ACK
Handle 5
Chunk Sequence 1

CHUNK_SEND
Handle 5
Chunk Sequence 3
Last Chunk
Chunk Size 42 Bytes
Chunk 3 Data

CHUNK_SEND_ACK
Handle 5
Chunk Sequence 3
Last Chunk
Response: SET_CERTIFICATE_RSP

SPDM Header

SET_CERTIFICATE_RSP

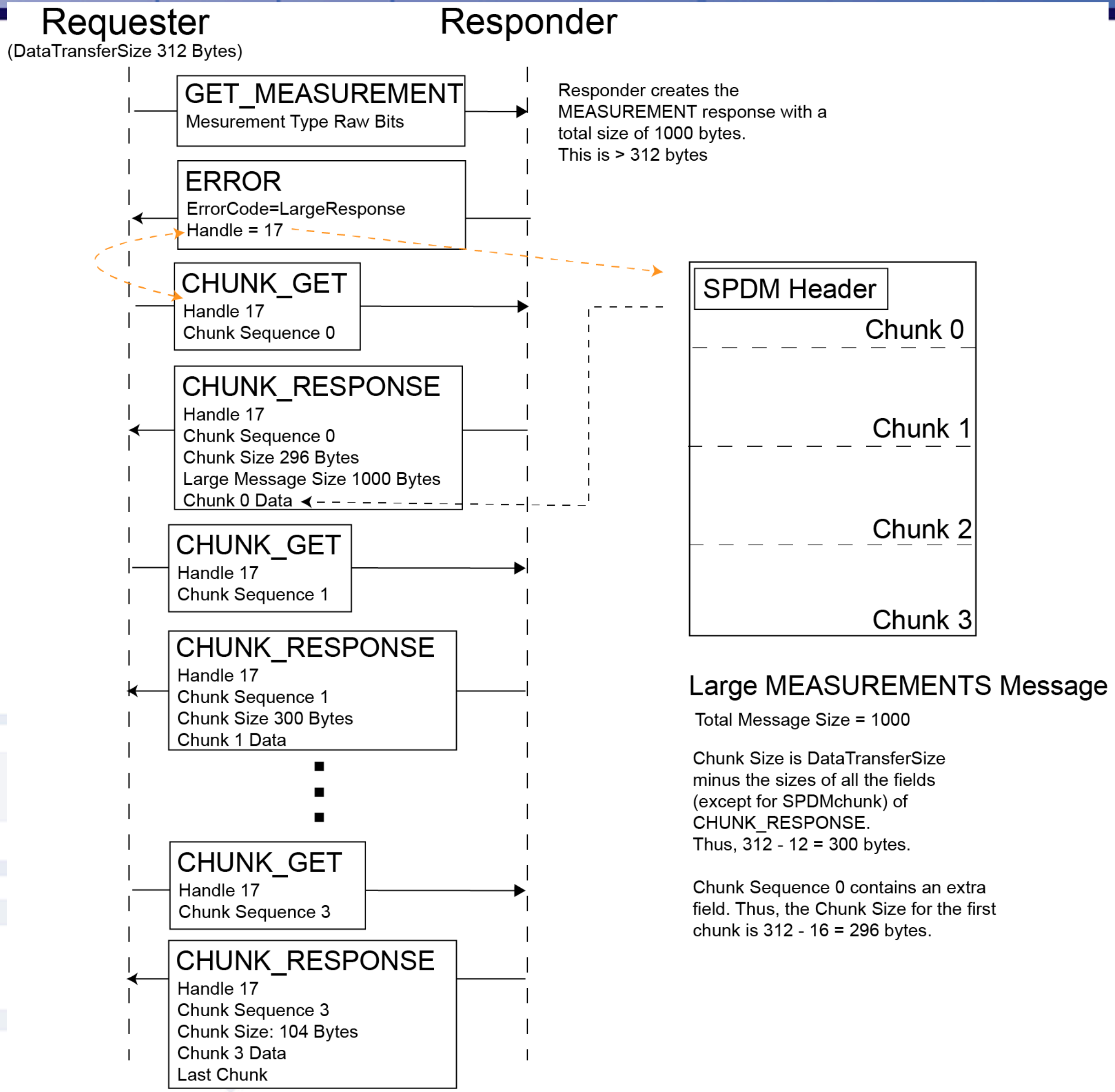
Large SET_CERTIFICATE Message

Total Message Size = 800

Chunk Size is DataTransferSize minus the sizes of all the fields (except for SPDMchunk) of CHUNK_SEND_REQUEST. Thus, 266 - 12 = 254 bytes.

Chunk Sequence 0 contains an extra field. Thus, the Chunk Size for the first chunk is 266 - 16 = 250 bytes.

Retrieve Large SPDM Response Flow



Requester
(DataTransferSize 312 Bytes)

Responder

GET_MEASUREMENT
Mesurement Type Raw Bits

Responder creates the MEASUREMENT response with a total size of 1000 bytes.
This is > 312 bytes

ERROR
ErrorCode=LargeResponse
Handle = 17

CHUNK_GET
Handle 17
Chunk Sequence 0

CHUNK_RESPONSE
Handle 17
Chunk Sequence 0
Chunk Size 296 Bytes
Large Message Size 1000 Bytes
Chunk 0 Data

CHUNK_GET
Handle 17
Chunk Sequence 1

CHUNK_RESPONSE
Handle 17
Chunk Sequence 1
Chunk Size 300 Bytes
Chunk 1 Data

CHUNK_GET
Handle 17
Chunk Sequence 3

CHUNK_RESPONSE
Handle 17
Chunk Sequence 3
Chunk Size: 104 Bytes
Chunk 3 Data
Last Chunk

SPDM Header
Chunk 0
Chunk 1
Chunk 2
Chunk 3

Large MEASUREMENTS Message

Total Message Size = 1000

Chunk Size is DataTransferSize minus the sizes of all the fields (except for SPDMchunk) of CHUNK_RESPONSE.
Thus, 312 - 12 = 300 bytes.

Chunk Sequence 0 contains an extra field. Thus, the Chunk Size for the first chunk is 312 - 16 = 296 bytes.