Combining EDHOC and OSCORE draft-palombini-core-oscore-edhoc-00

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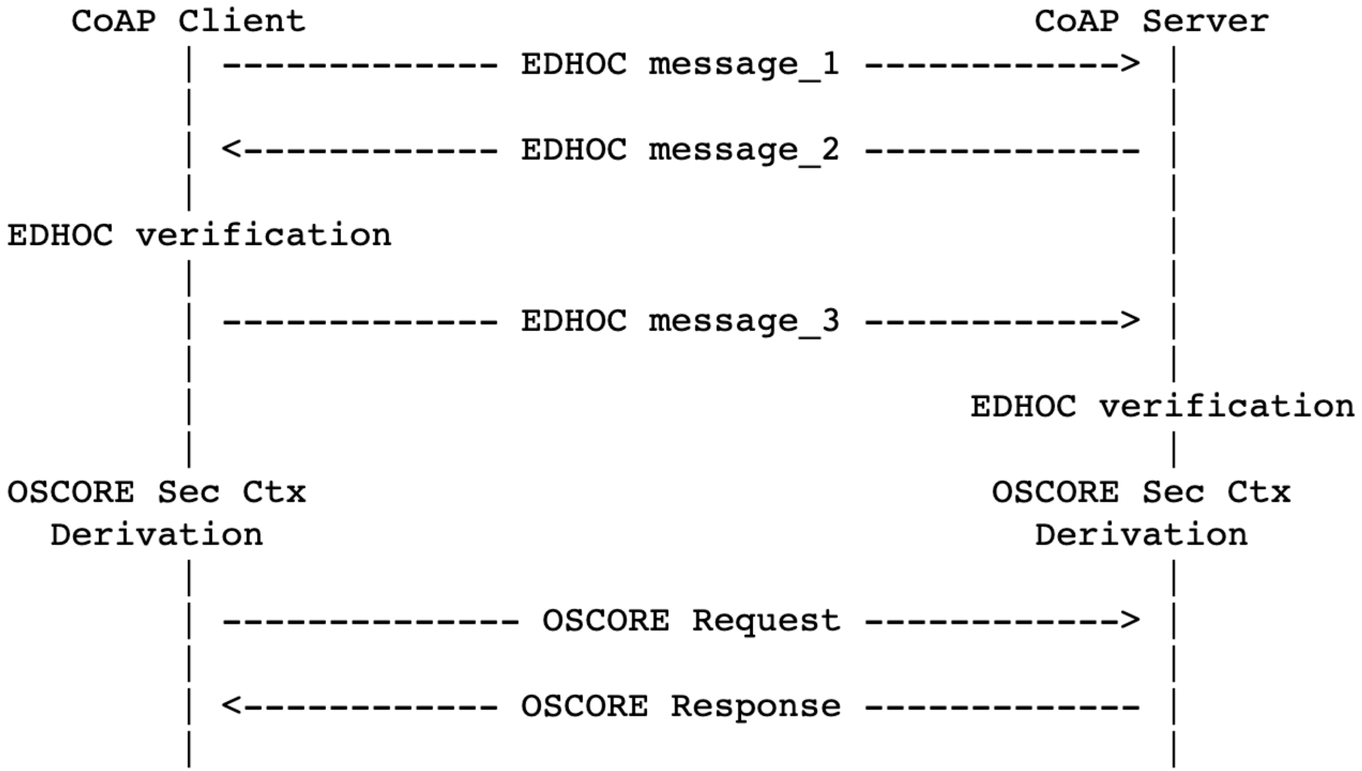
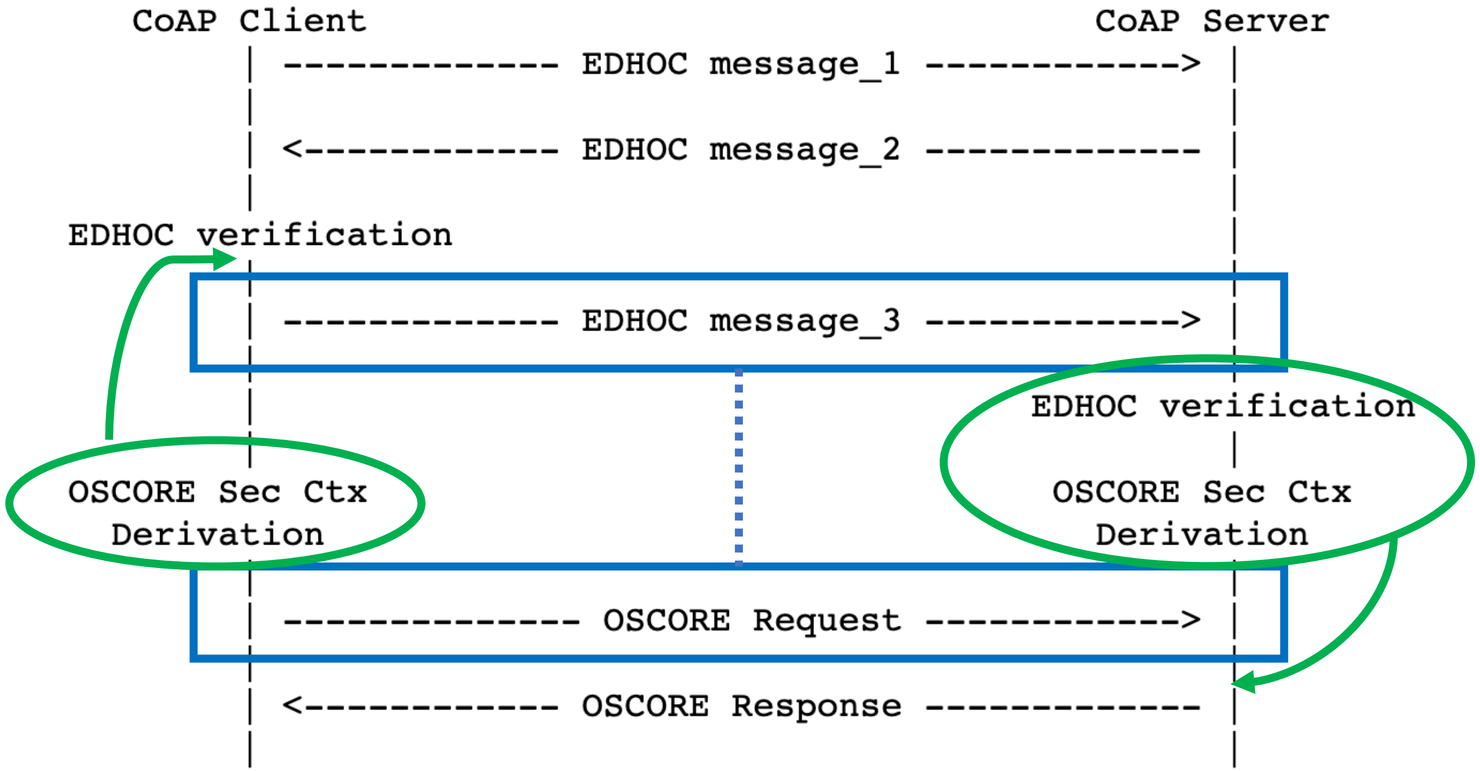
How to run EDHOC and OSCORE over CoAP?



```
   CoAP Client                                     CoAP Server
        | ------------- EDHOC message_1 ------------> |
        |                                             |
        | <------------ EDHOC message_2 ------------- |
        |                                             |
EDHOC verification                                    |
        |                                             |
        | ------------- EDHOC message_3 ------------> |
        |                                             |
        |                                    EDHOC verification
        |                                             |
OSCORE Sec Ctx                                 OSCORE Sec Ctx
  Derivation                                     Derivation
        |                                             |
        | -------------- OSCORE Request ------------> |
        |                                             |
        | <------------ OSCORE Response ------------- |
        |                                             |
```

Figure 1: EDHOC and OSCORE run sequentially

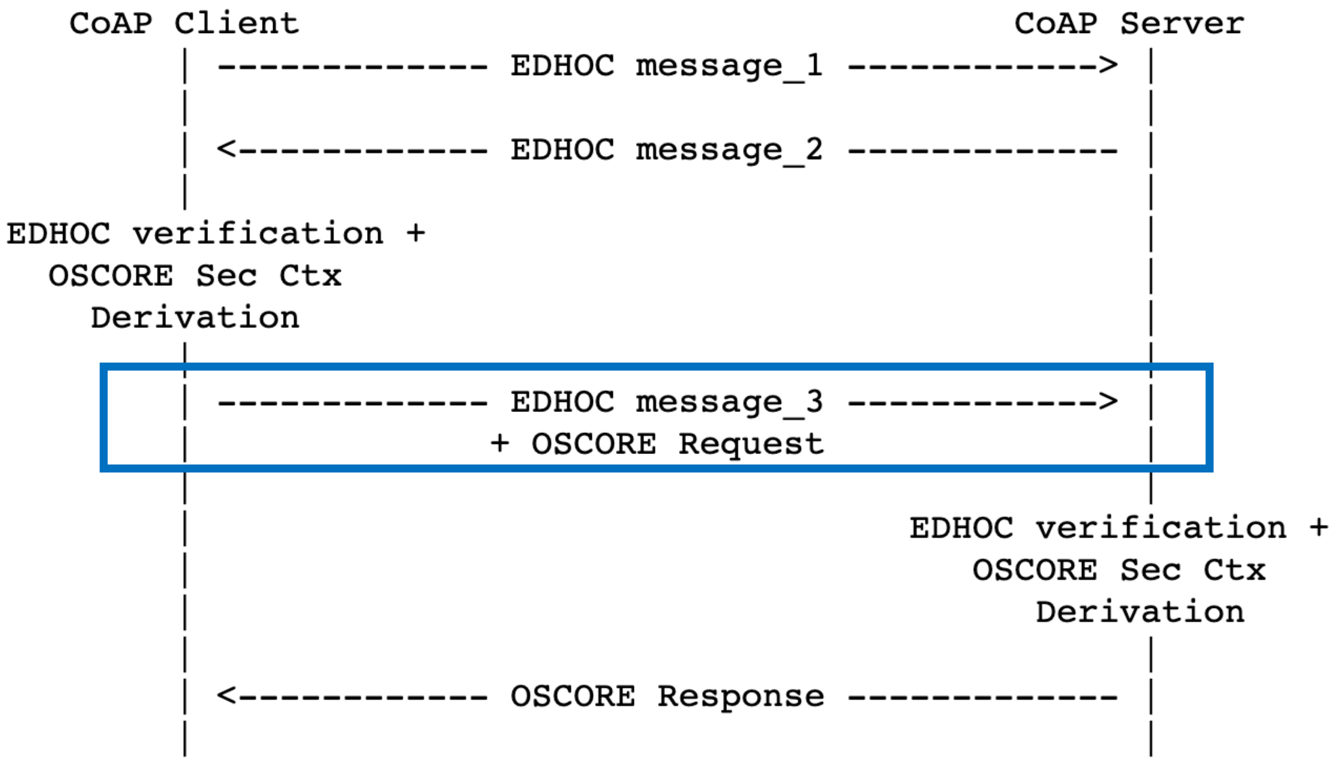
Can we optimize this 3 round-trips exchange?



```
   CoAP Client                                  CoAP Server
         | ------------- EDHOC message_1 ------------> |
         |                                             |
         | <------------ EDHOC message_2 ------------- |
         |                                             |
EDHOC verification                                     |
         |                                             |
         | ------------- EDHOC message_3 ------------> |
         |                                             |
         |                                   EDHOC verification
         |                                             |
  OSCORE Sec Ctx                                OSCORE Sec Ctx
    Derivation                                    Derivation
         |                                             |
         | -------------- OSCORE Request ------------> |
         |                                             |
         | <------------ OSCORE Response ------------- |
         |                                             |
```

Figure 1: EDHOC and OSCORE run sequentially

Can we optimize? Yes!



```
   CoAP Client                                     CoAP Server
        | ------------- EDHOC message_1 ------------> |
        |                                             |
        | <------------ EDHOC message_2 ------------- |
        |                                             |
EDHOC verification +                                  |
  OSCORE Sec Ctx                                      |
    Derivation                                        |
        |                                             |
        | ------------- EDHOC message_3 ------------> |
        |             + OSCORE Request                |
        |                                             |
        |                                    EDHOC verification +
        |                                       OSCORE Sec Ctx
        |                                         Derivation
        |                                             |
        | <------------ OSCORE Response ------------- |
        |                                             |
```

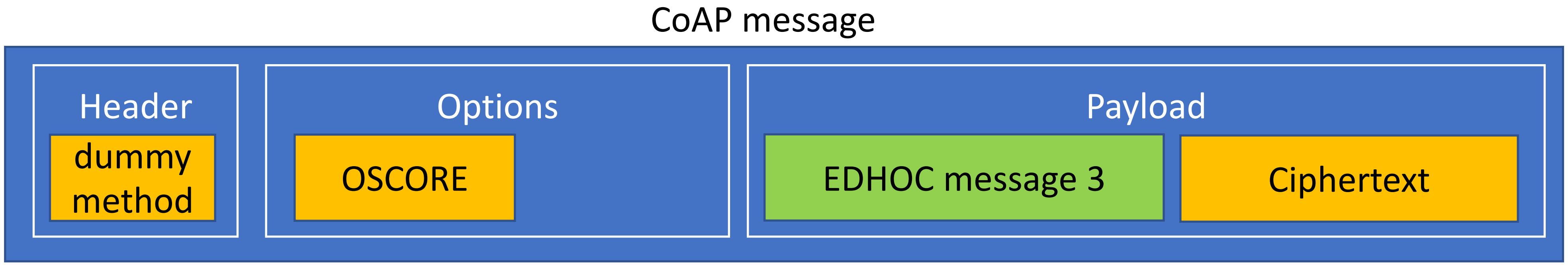
Figure 2: EDHOC and OSCORE combined

How to send those 2 messages together?

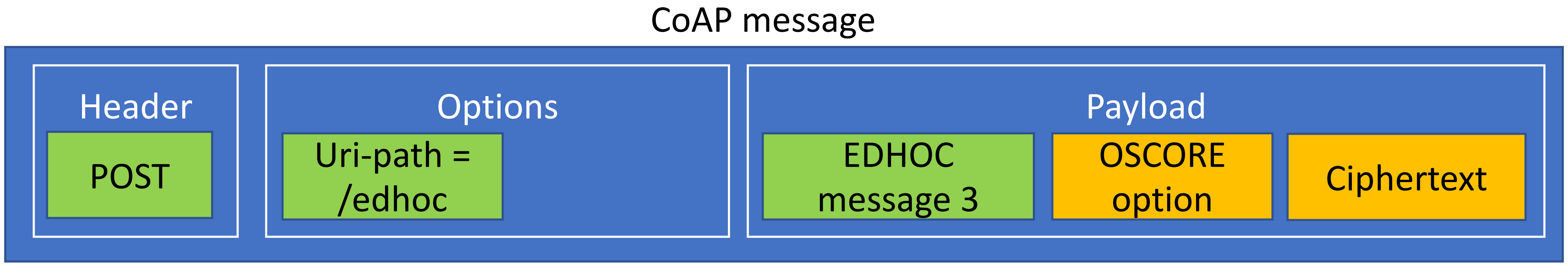
2 options:

- **Send EDHOC in OSCORE**
- **Send OSCORE in EDHOC**

EDHOC in OSCORE or OSCORE in EDHOC?



EDHOC in OSCORE



OSCORE in EDHOC

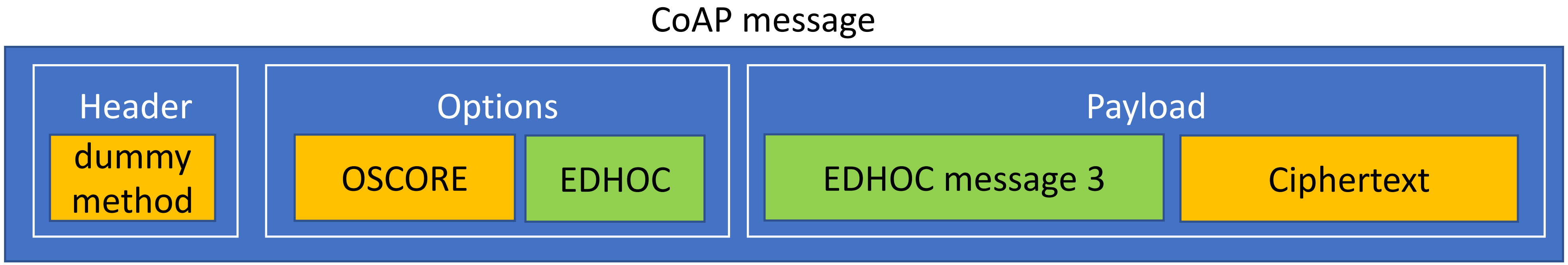
How to send those 2 messages together?

4 sub-options:

- **Send EDHOC in OSCORE**
  1. Signalling in a new CoAP option
  2. Signalling in the OSCORE option (use a bit in the flagbits)
- **Send OSCORE in EDHOC**
  3. Signalling in a new CoAP option (with processing different from 1.)
  4. Signalling based on the number of elements in CoAP payload (and possibly a specific Content-Format)

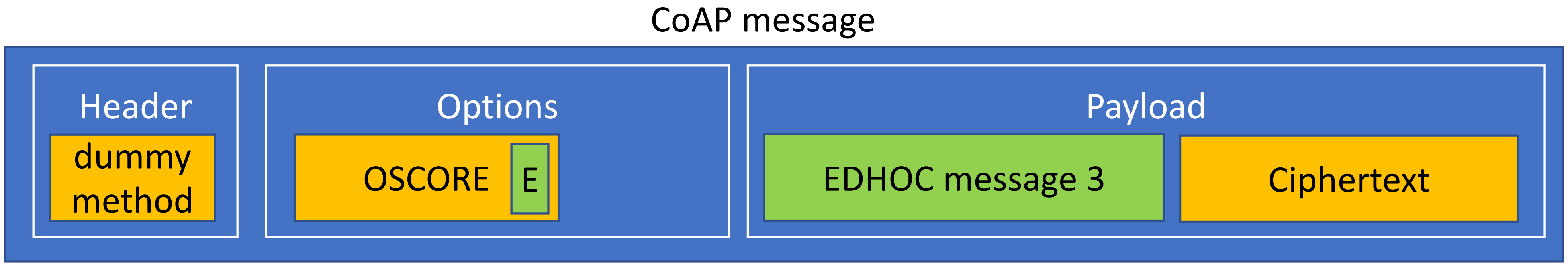
EDHOC in OSCORE – Signalling options

1.



EDHOC in OSCORE - Signalling in new CoAP option

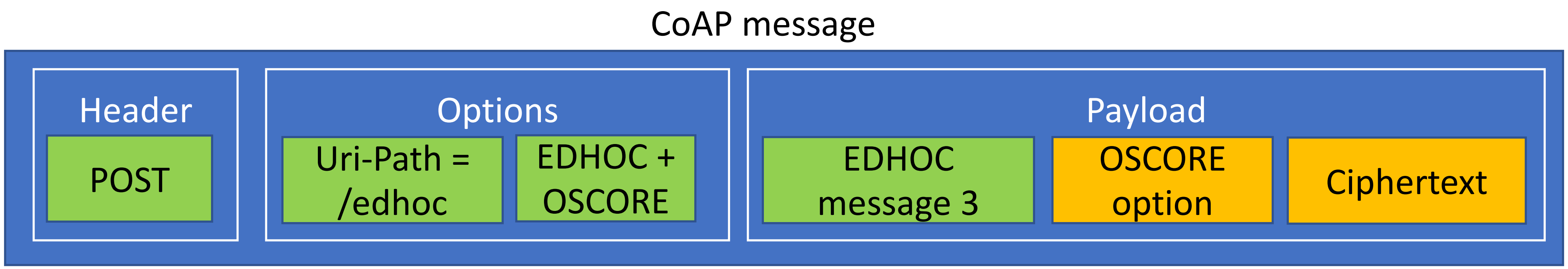
2.



EDHOC in OSCORE - Signalling in OSCORE option

OSCORE in EDHOC – Signalling options

3.



CoAP message

Header

POST

Options

Uri-Path = /edhoc

EDHOC + OSCORE

Payload

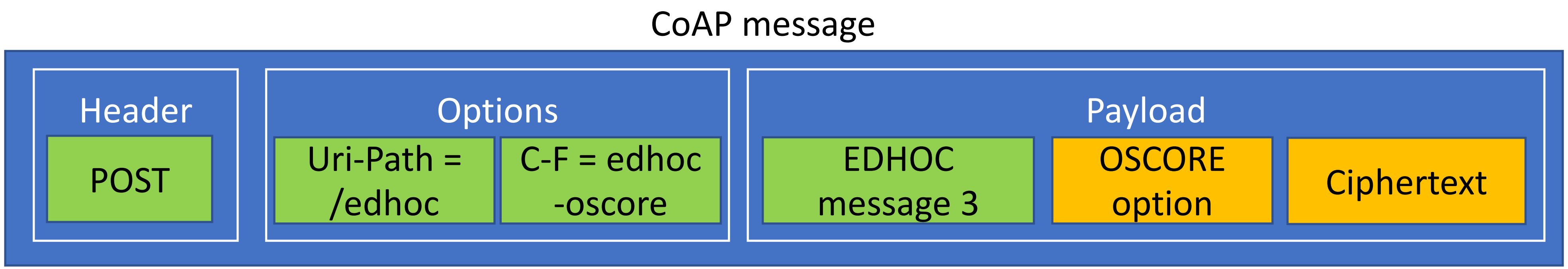
EDHOC message 3

OSCORE option

Ciphertext

OSCORE in EDHOC - Signalling in new CoAP option

4.



CoAP message

Header

POST

Options

Uri-Path = /edhoc

C-F = edhoc -oscore

Payload

EDHOC message 3

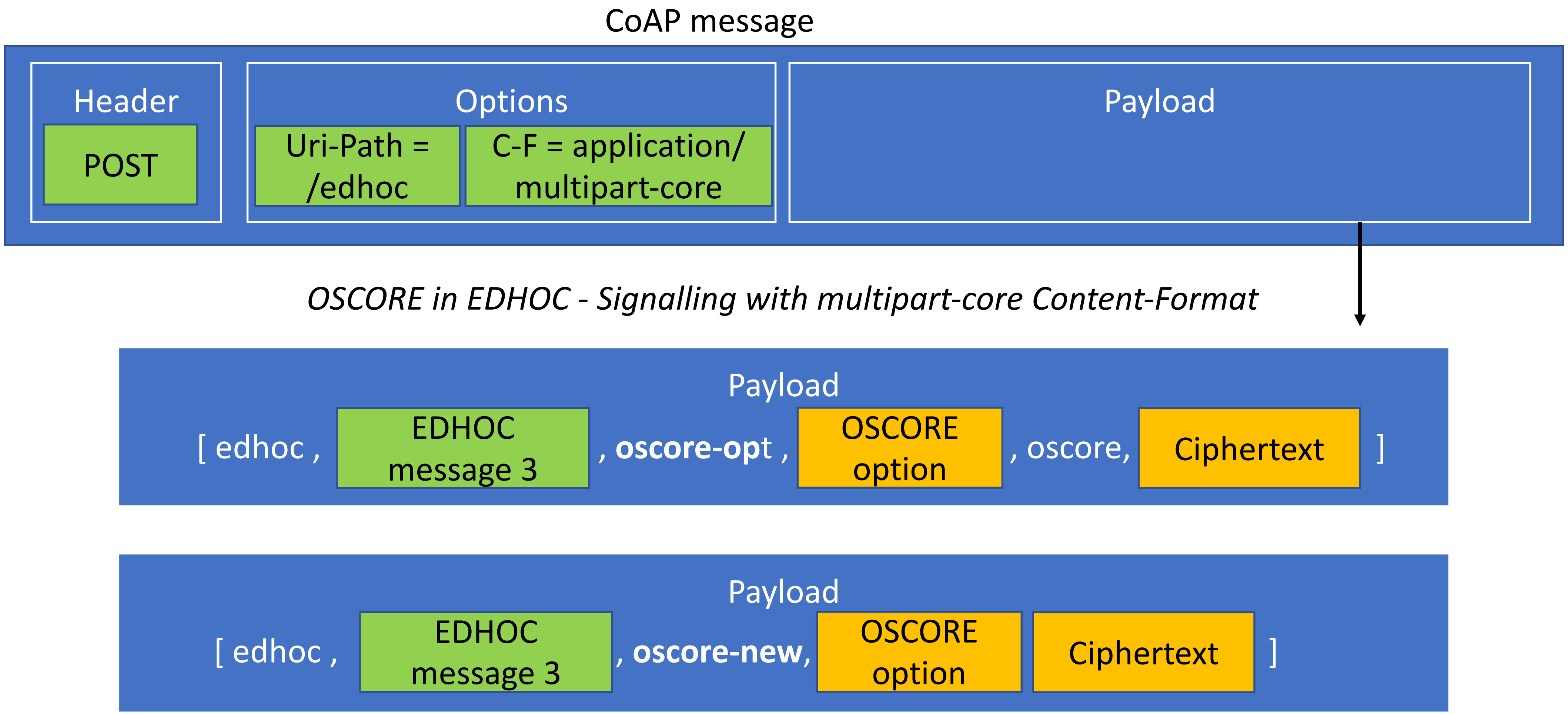
OSCORE option

Ciphertext

OSCORE in EDHOC - Signalling with new Content-Format

Using multipart-core

4.bis



CoAP message

Header

POST

Options

Uri-Path = /edhoc

C-F = application/multipart-core

Payload

OSCORE in EDHOC - Signalling with multipart-core Content-Format

Payload

[edhoc , EDHOC message 3 , **oscore-opt** , OSCORE option , oscore, Ciphertext]

Payload

[edhoc , EDHOC message 3 , **oscore-new**, OSCORE option Ciphertext]

Way Forward

- Get feedback + reviews

- Pick one option and progress it