COSE Headers for Carrying CBOR Compressed Certificates

draft-mattsson-cose-cbor-cert-compress-00

COSE, IETF 107, April 2020

Headers for Carrying CBOR Compressed Certificates

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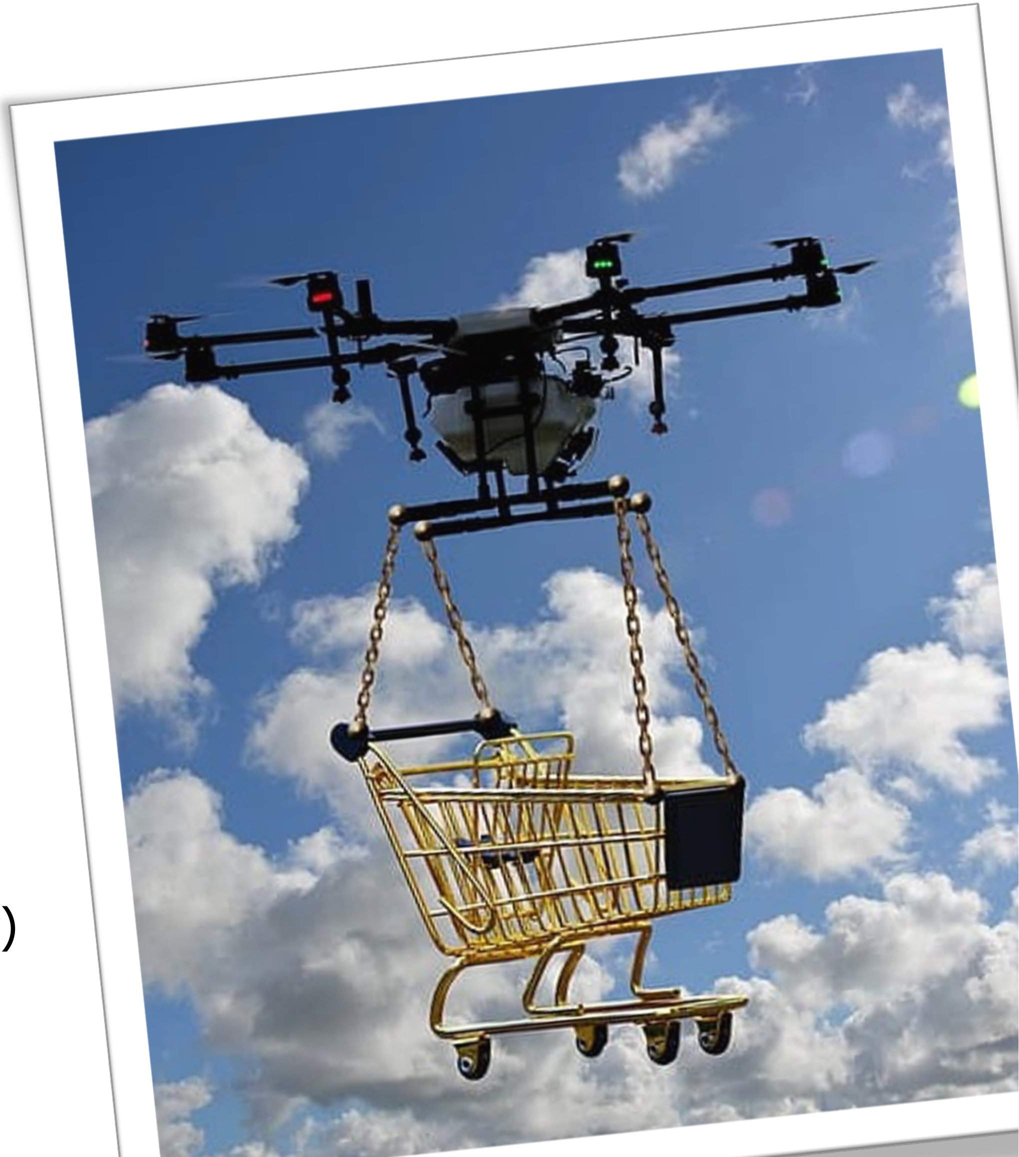
- New header attribute 'CBORchain' similar to 'x5chain' to convey a X.509 certificate chain compressed with CBOR.
- X.509 certificates take up a large part of the total number of bytes when used in COSE.
- Best practice is now to encrypt certificates, this means compression needs to be done in the protocol itself.
- Uses draft-raza-ace-cbor-certificates to compress certificates by encoding them from DER to CBOR.
- The aim is to be compatible with all RFC 7925 profiled certificates.
- General purpose compression algorithms (without dictionary) is not able to compress RFC 7925 X.509 certs much at all.



CBOR Compressed RFC 7925 X.509 certificates

draft-raza-ace-cbor-certificates-04

CBOR compression brings:

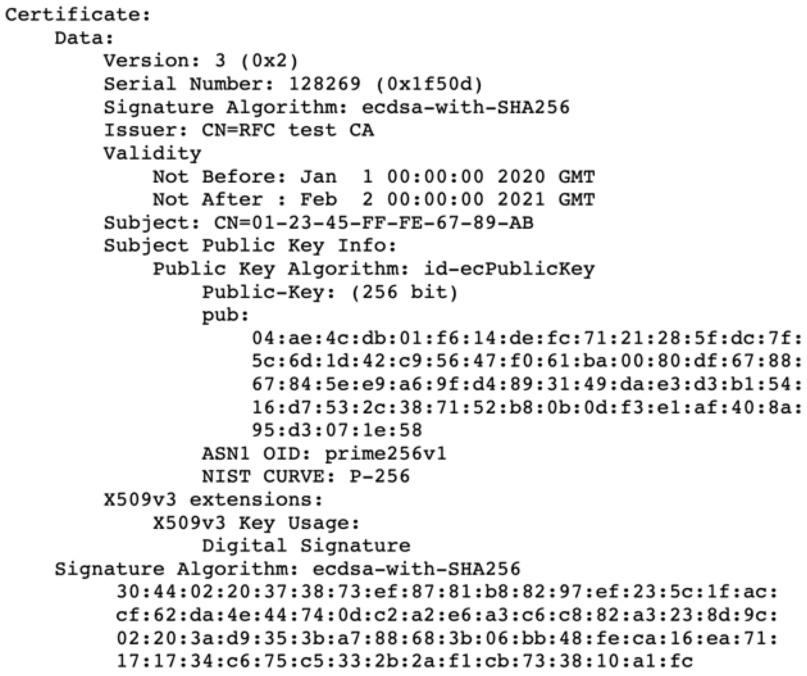
1) Compactness

2) Compatibility with and migration path from X.509

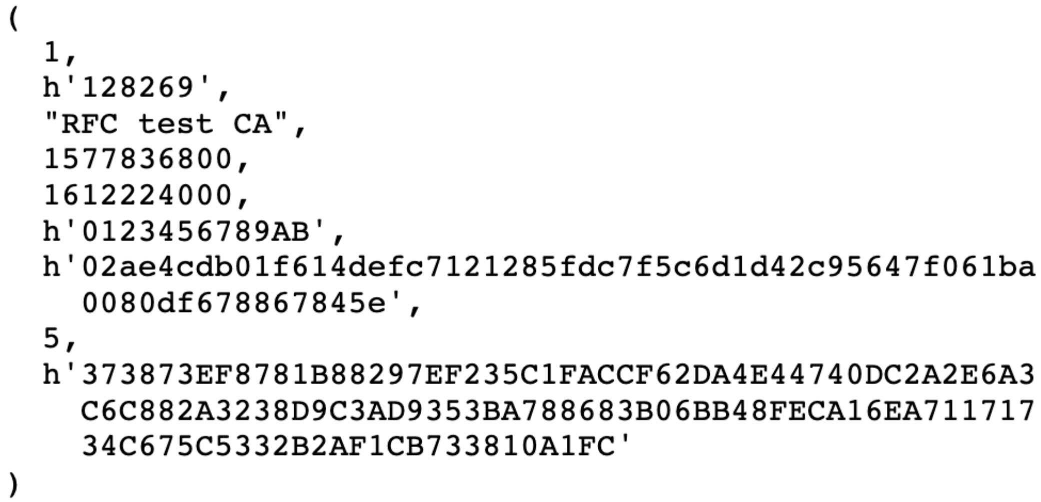
3) Smaller footprint than general compression algorithms.

4) Re-use of CBOR already used by COSE, but support for ASN.1 DER is still needed.

	RFC 7925 X.509	zlib	CBOR Compression
Certificate Size	314 bytes	295 bytes	136 bytes



```
Certificate:
    Data:
        Version: 3 (0x2)
        Serial Number: 128269 (0x1f50d)
        Signature Algorithm: ecdsa-with-SHA256
        Issuer: CN=RFC test CA
        Validity
            Not Before: Jan  1 00:00:00 2020 GMT
            Not After : Feb  2 00:00:00 2021 GMT
        Subject: CN=01-23-45-FF-FE-67-89-AB
        Subject Public Key Info:
            Public Key Algorithm: id-ecPublicKey
                Public-Key: (256 bit)
                pub:
                    04:ae:4c:db:01:f6:14:de:fc:71:21:28:5f:dc:7f:
                    5c:6d:1d:42:c9:56:47:f0:61:ba:00:80:df:67:88:
                    67:84:5e:e9:a6:9f:d4:89:31:49:da:e3:d3:b1:54:
                    16:d7:53:2c:38:71:52:b8:0b:0d:f3:e1:af:40:8a:
                    95:d3:07:1e:58
                ASN1 OID: prime256v1
                NIST CURVE: P-256
        X509v3 extensions:
            X509v3 Key Usage:
                Digital Signature
    Signature Algorithm: ecdsa-with-SHA256
         30:44:02:20:37:38:73:ef:87:81:b8:82:97:ef:23:5c:1f:ac:
         cf:62:da:4e:44:74:0d:c2:a2:e6:a3:c6:c8:82:a3:23:8d:9c:
         02:20:3a:d9:35:3b:a7:88:68:3b:06:bb:48:fe:ca:16:ea:71:
         17:17:34:c6:75:c5:33:2b:2a:f1:cb:73:38:10:a1:fc
```



```
(
  1,
  h'128269',
  "RFC test CA",
  1577836800,
  1612224000,
  h'0123456789AB',
  h'02ae4cdb01f614defc7121285fdc7f5c6d1d42c95647f061ba
    0080df678867845e',
  5,
  h'373873EF8781B88297EF235C1FACCF62DA4E44740DC2A2E6A3
    C6C882A3238D9C3AD9353BA788683B06BB48FECA16EA711717
    34C675C5332B2AF1CB733810A1FC'
)
```

Example CBOR Compression of RFC 7925 X.509

Discussion

- Is certificate compression interesting for COSE?
- Is the RFC 7925 certificate profile useful for COSE or is something missing?
- Which kind of headers (x5chain, x5bag, x5t, x5u) should support compression?
- How should compression be indicated? New headers like 'CBORchain' or e.g. with an array?

  [COSE Header Attribute, Compression Alg]