draft-fieau-cdni-interfaces-https-delegation-04

CDNI WG

Frédéric Fieau, Emile Stephan Orange
Sanjay Mishra Verizon

IETF 102 – Montreal
July 2018

Agenda

- Motivation for standardizing delegation for CDNI
- Update since last proposal
- Metadata examples

Motivation for HTTPS Delegation for CDNI

- Metadata for HTTPS Delegation?
  - dCDNs are currently not aware of supported delegation methods by uCDN
  - Adding delegation metadata enables CDNs to become aware of one or more delegation methods (without the need for shared private keys)

- Develop a common framework for HTTPS delegation
  - Integrate standards based delegation scheme to CDNI metadata
  - Would want to add Metadata that describes how to bootstrap delegation methods between the uCDN and dCDN.

- HTTPS traffic delegation
  - Does not changes Security
    - Not in scope to instruct how to manage certificates
  - Provides a means to communicate supported HTTPS delegation methods

- Several delegation methods are currently being proposed in the IETF:
    - STAR
    - SubCerts
    - LURK

Updates to **draft-fieau-cdni-interfaces-https-delegation since -02**

- ***draft-fieau-cdni-interfaces-https-delegation*** proposes extensions to the CDNi interfaces to exchange delegation metadata.

- This -04 version has textual and metadata model edits

- The current draft supports delegation methods objects:
  - Short Term Automatically Renewed certificates (STAR)
    - https://datatracker.ietf.org/doc/draft-ietf-acme-star/
  - Delegated Credentials for TLS / SubCerts
    - https://datatracker.ietf.org/doc/draft-ietf-tls-subcerts/
  - **New: LURK**
    - https://datatracker.ietf.org/doc/draft-mglt-lurk-lurk/
    - https://datatracker.ietf.org/doc/draft-mglt-lurk-tls12/
    - https://tools.ietf.org/html/draft-mglt-lurk-tls13-00

Added: Support for LURK draft-mglt-lurk-tls

- Use case:
  - uCDN delegates HTTPS delivery to dCDN using its own credentials derived from a KeyServer

- Proposal:
  - Add a new metadata object in RFC8006 to support the LURK draft (draft-mglt-lurk-tls).

```
LurkDelegationMethod: {
        "generic-metadata-type": "MI.LurkDelegationMethod",
        "generic-metadata-value": {
            "keyserver": Endpoint,
         }
}
```

Example

```
PathMatch:
{
   "path-pattern": {
      "pattern": "/movies/*",
      "case-sensitive": true},
   "path-Metadata": {
      "type": "MI.PathMetadata",
      "href": "https://metadata.ucdn/video.example.com/movies"}
}

PathMetadata:
{
   "metadata": [
      {
      "generic-metadata-type": "MI.SecureDelegation"
      "generic-metadata-value": {
         "methods ": [“MI.AcmeStarDelegationMethod”,
                 “MI.LurkDelegationMethod”]
      }
   }]
}
```

Delegation Extension to PathMetaData

- uCDN is delegating HTTPS delivery to dCDN, and it needs to convey information about how delegation is enforced.
- We propose an extension to PathMetadata (RFC8006) through the « MI.SecureDelegation » object that allows the uCDN to describe delegation information to a dCDN.
- This method involves the definition of the delegation metadata for each path URL of the delegated entity (dCDN)

```
PathMetadata:
{
    "metadata": [
        {
        "generic-metadata-type": "MI.SecureDelegation"
        "generic-metadata-type": {
            "methods ": Array of DelegationMethods
        }
    }]
}
```

Example updated from draft –05: without MI.SecureDelegation

Explicity indicate support method such as AcmeStarDelegationMethod and/or SubcertsDelegationMethod, and/or LurkDelegationMethod:

PathMetadata:

```
{
    "metadata": [
        {
        "generic-metadata-type": "MI.AcmeStarDelegationMethod"
        "generic-metadata-value": {
          "starproxy": "10.2.2.2",
          "acmeserver" : "10.2.3.3",
          "credentialslocationuri": “www.ucdn.com/credentials",
          "periodicity": 36000
        },
        {
        "generic-metadata-type": "MI.LurkDelegationMethod"
        "generic-metadata-value": {
            "keyserver": “10.2.2.2”,
        }
    }]
}
```

Questions?

Thank you

Backup

Support for ACME/STAR
draft-ietf-acme-star

- Use case:
    - uCDN delegates HTTPS delivery to dCDN requesting the CA to issue a short-term automatically renewed certificate.

- Proposal:
    - Add metadata object in RFC8006 to support the draft ACME/STAR delegation model (draft-ietf-acme-star).

```
AcmeStarDelegationMethod: {
    "generic-metadata-type": "MI.AcmeStarDelegationMethod",
    "generic-metadata-value": {
        "starproxy": "10.2.2.2",
        "acmeserver" : "10.2.3.3",
        "credentialslocationuri": “www.ucdn.com/credentials",
        "periodicity": 36000
    }
}
```

Support for TLS/SubCerts
draft-ietf-tls-subcerts

- Use case:
  - uCDN delegates HTTPS delivery to dCDN using its own credentials without the need to request a certificate from the CA

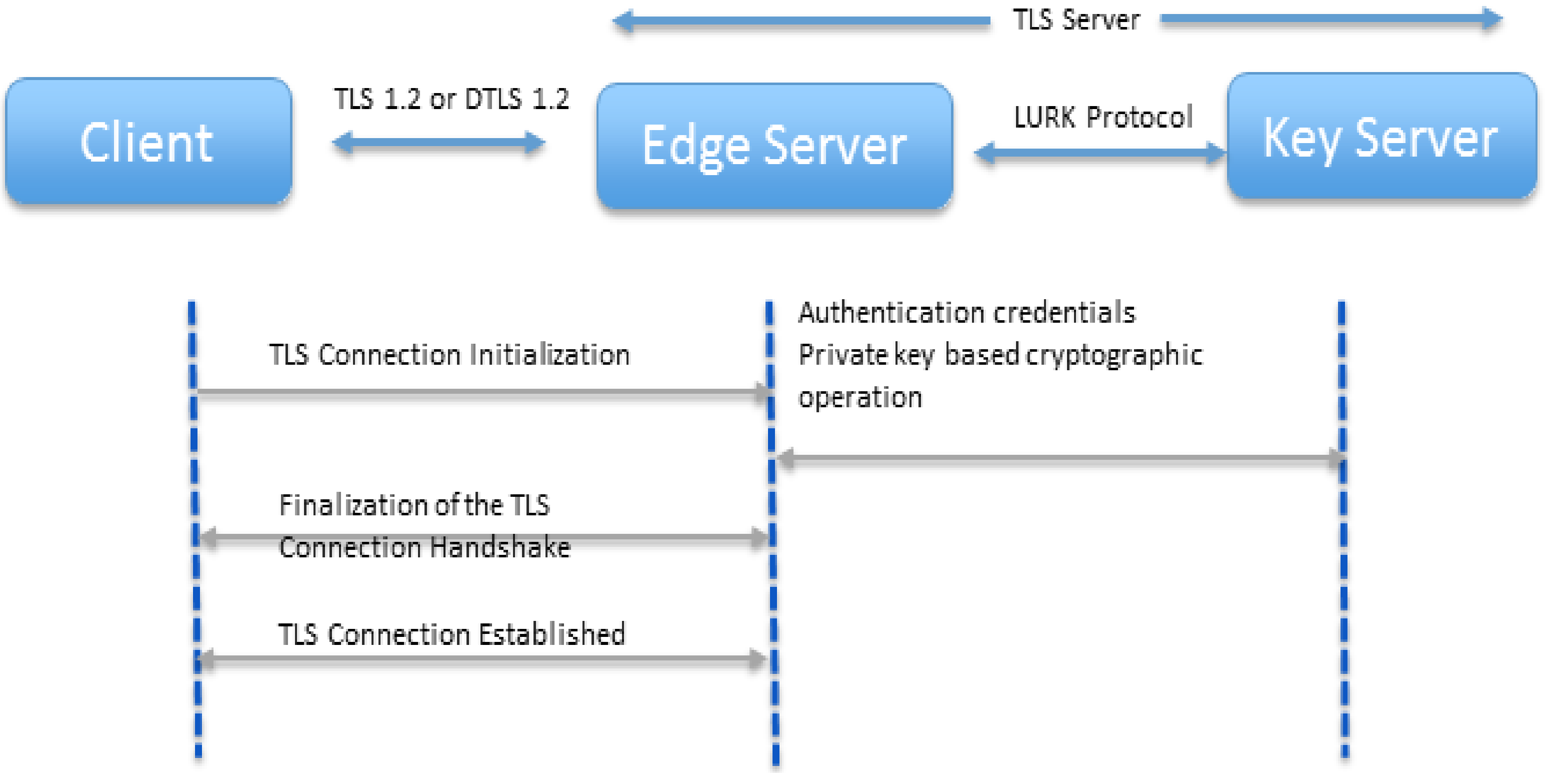
- Proposal:
  - Add a new metadata object in RFC8006 to support the draft TLS/SubCerts delegation model (draft-ietf-tls-subcerts).

```
SubCertDelegationMethod: {
       "generic-metadata-type": "MI.SubcertsDelegationMethod",
       "generic-metadata-value": {
           "credentialsdelegatingentity": Endpoint,
           "credentialrecipiententity": Endpoint,
           "credentialslocationuri": Link,
           "periodicity": Periodicity
       }
}
```

STAR call-flow in CDNI

```
  uCDN
 STAR Proxy/                dCDN                   CA
 ACME client              STAR Client        ACME/STAR Server
     |                        |                     |
     |SecureDelegationMetadata|                     |
     |<---------------------->|                     |
     |                        |                     |
     |   Application/Challenge for STAR dCDN cert   |
     |<-------------------------------------------->|
     |                        |                     |
     |                        |  Retrieve STAR cert |
     |                        |<------------------->|
     |                        |                     +------.
     |                        |                     |      |
     |                        |                     | Automatic renewal
     |                        |                     |      |
     |                        |                     |<-----'
     |                        |  Retrieve STAR cert |
     |                        |<------------------->|
     |                        |                     |
     |        Terminate Order ID (STAR API)         |
     |--------------------------------------------->|
     |        Done            |                     |
     |<---------------------------------------------|
     |                        |                     |
```

Limited Usage of Remote Keys



TLS Server

Client

TLS 1.2 or DTLS 1.2

Edge Server

LURK Protocol

Key Server

TLS Connection Initialization

Authentication credentials
Private key based cryptographic operation

Finalization of the TLS Connection Handshake

TLS Connection Established