Using Verifiable Credentials in IoT Services

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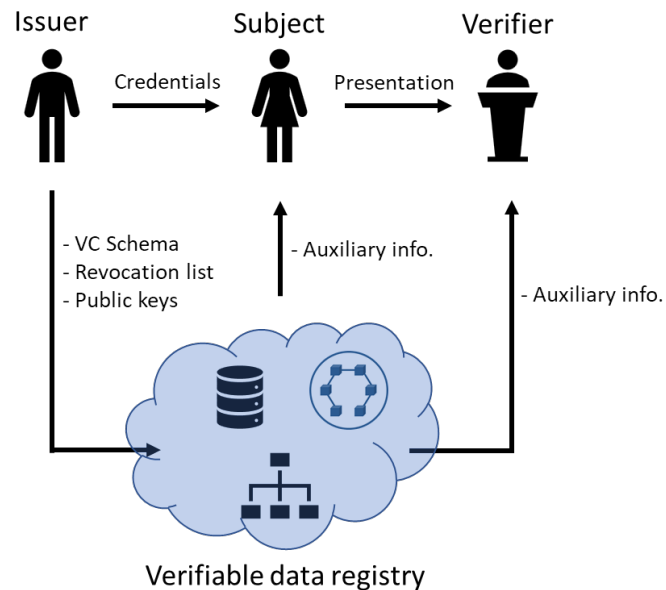Dmitrij Lagutin, Aalto University, Finland

About SOFIE

- SOFIE enables interoperability between existing IoT platforms
  - Utilizes distributed ledger technologies
  - 3-year EU Horizon 2020 project, will end in December 2020
- SOFIE functionality will be provided through its framework*
  - DIDs and VCs are a key ingredient of the SOFIE framework

* https://github.com/SOFIE-project/Framework

VC in a nutshell

- A standard* way to express credentials on the Web

- VCs complement DIDs

- Usually machine-readable

* W3C, Verifiable Credentials Data Model 1.0, https://www.w3.org/TR/vc-data-model/

VC Structure

Context
Issuer Id
Credential • Type • Subject Id • Claims
Proof

The "Sofie Credential"

```
sofie_credential = {
  "@context": [
    "https://www.w3.org/2018/credentials/v1",
    "https://mm.aueb.gr/contexts/access_control/v1"
  ],
  "id": "https://www.sofie-iot.eu/credentials/examples/1",
  "type": ["VerifiableCredential"],
  "issuer": "did:nacl:E390CF3B5B93E921C45ED978737D89F61B8CAFF9DE76BFA5F63DA20386BCCA3B",
  "issuanceDate": "2010-01-01T19:23:24Z",
  "credentialSubject": {
    "id": "did:nacl:A490CF3B5B93E921C45ED978737D89F61B8CAFF9DE76BFA5F63DA20386BCCA62",
    "type": ["AllowedURLs"],
    "acl": [
      {
        "url": "http://sofie-iot.eu/device1",
        "methods": ["GET","POST"]
      },
      {
        "url": "http://sofie-iot.eu/device2",
        "methods": ["GET"]
      }
    ]
  }
}
```

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        "methods": ["GET"]
      }
    ]
  }
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```

WoT device configuration

```
{
    "@context": [
            "https://www.w3.org/2019/wot/td/v1",
            "https://mm.aueb.gr/contexts/access_control/v1"
            ],
    "id": "urn:dev:ops:32473-WoTLamp-1234",
    "title": "MyLampThing",
    "securityDefinitions": {
        "vc_acl": {
            "@type":["VerifiableCredential","AllowedURLs"],
            "scheme": "AllowedURLs",
            "context": "https://mm.aueb.gr/contexts/access_control/v1",
            "issuer": "did:nacl:E390CF3B5B93E921C45ED978737D89F61B8CAFF9DE76BFA5F63DA20386BCCA3B",
            "filter":[
                ["$.credentialSubject.acl[?(@.url='http://sofie-iot.eu/device1')]"]
            ]
        }
    },
    "security": [
        "vc_acl"
    ]
}
```
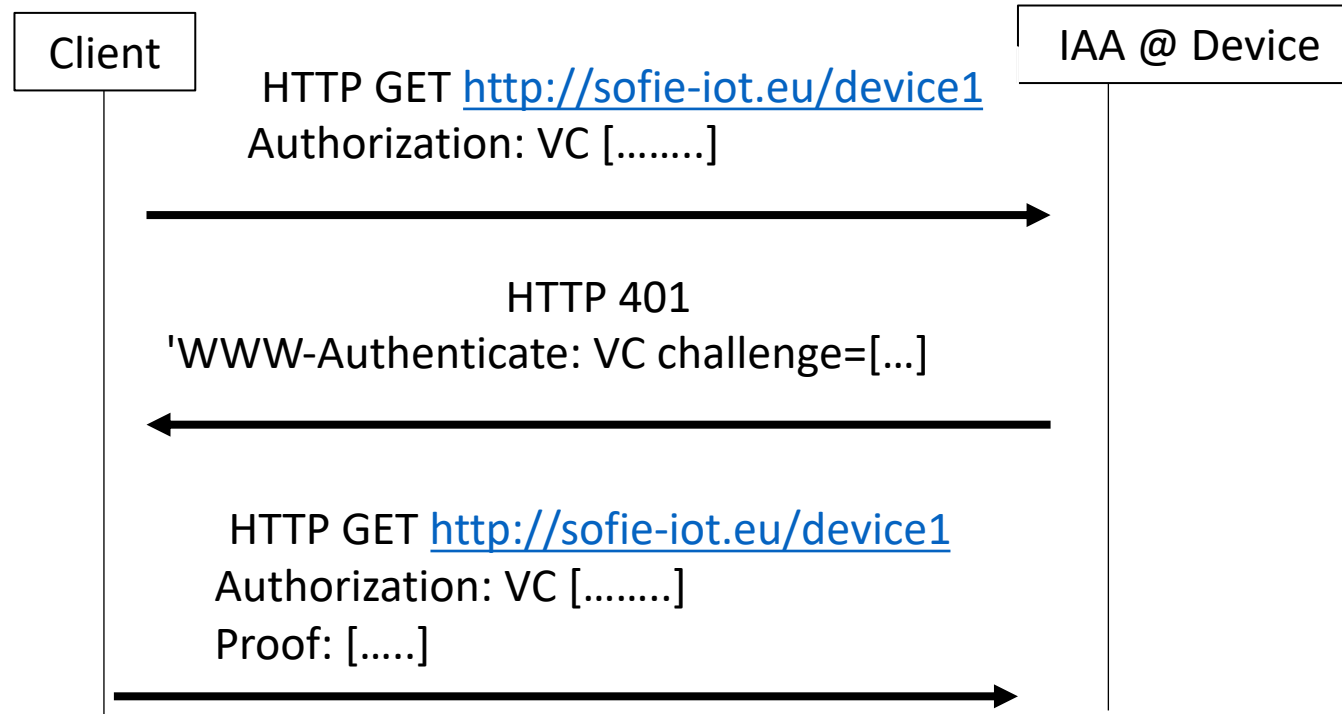
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        "issuer": "did:nacl:E390CF3B5B93E921C45ED978737D89F61B8CAFF9DE76BFA5F63DA20386BCCA3B",
        "filter":[
          ["$.credentialSubject.acl[?(@.url='http://sofie-iot.eu/device1')]"]
        ]
      }
    },
    "security": [
      "vc_acl"
    ]
}
```

SOFIE's Identity, Authentication, and Authorization Component*

* https://github.com/SOFIE-project/identity-authentication-authorization

Thank you

https://www.sofie-iot.eu/

https://github.com/SOFIE-project/Framework

https://www.sofie-iot.eu/news/integrating-verifiable-credentials-and-decentralized-identifiers-for-identification-and-author