Fixing healthcare data exchange with decentralized FOSS

Protect your API's with a decentralized trust layer

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Open standard to enable safe and correct exchange of healthcare data.

Goal

Create a (inter)national network of connected nodes, to enable frictionless healthcare data exchange with the patient in controll.

Breaking down the silos, enabling innovation, empowering care professions and patients.

Fixing healthcare data exchange with decentralized FOSS

- What is healthcare data exchange?
- Why is it broken?
- Why fix it with decentralized FOSS?

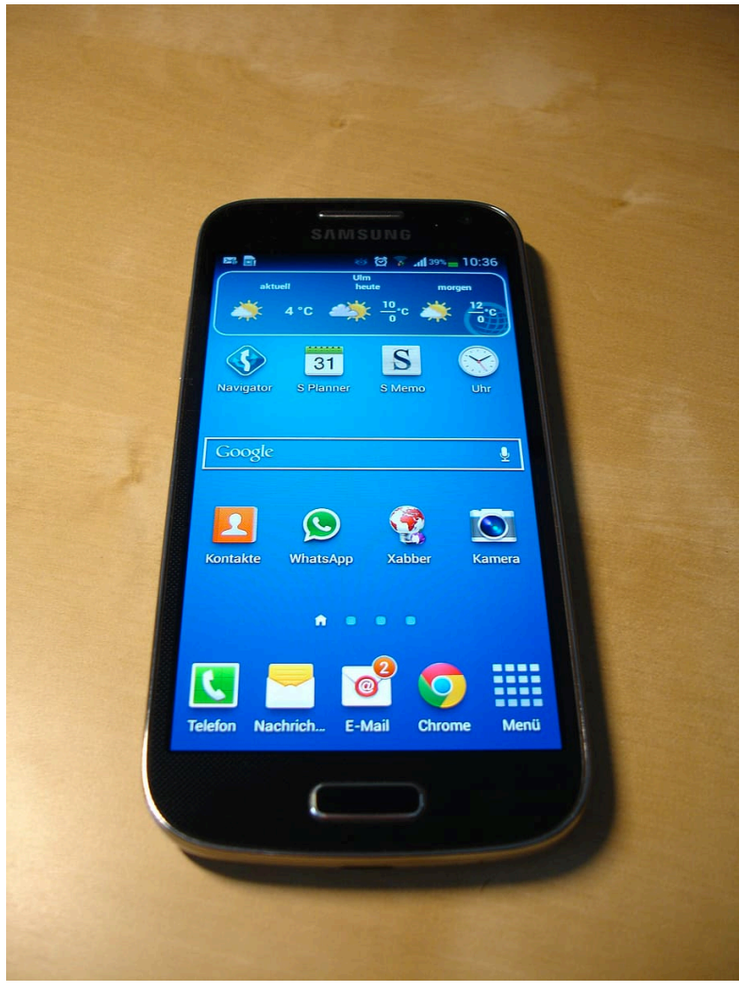
Medical data

- Medical files
- Lab results
- Eletronic health records
- Images

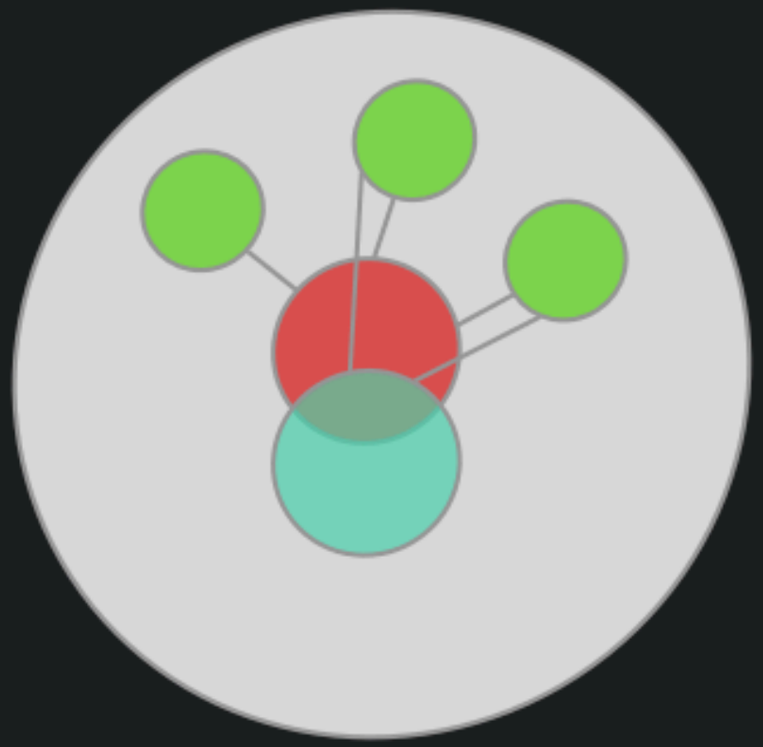
Exchange

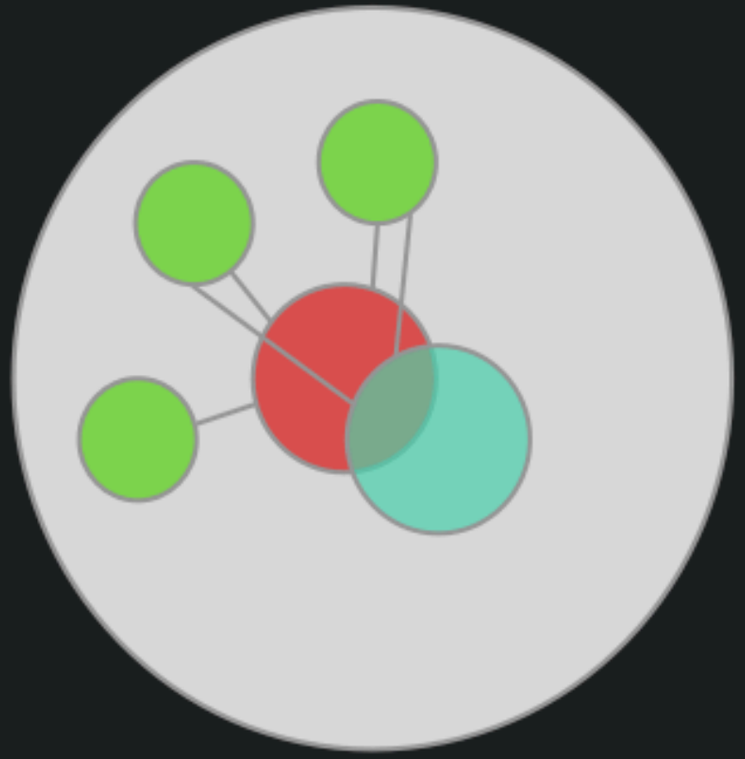
- Hospitals
- Mental healthcare institutions
- General practitioner
- Home care nurse
- Patient

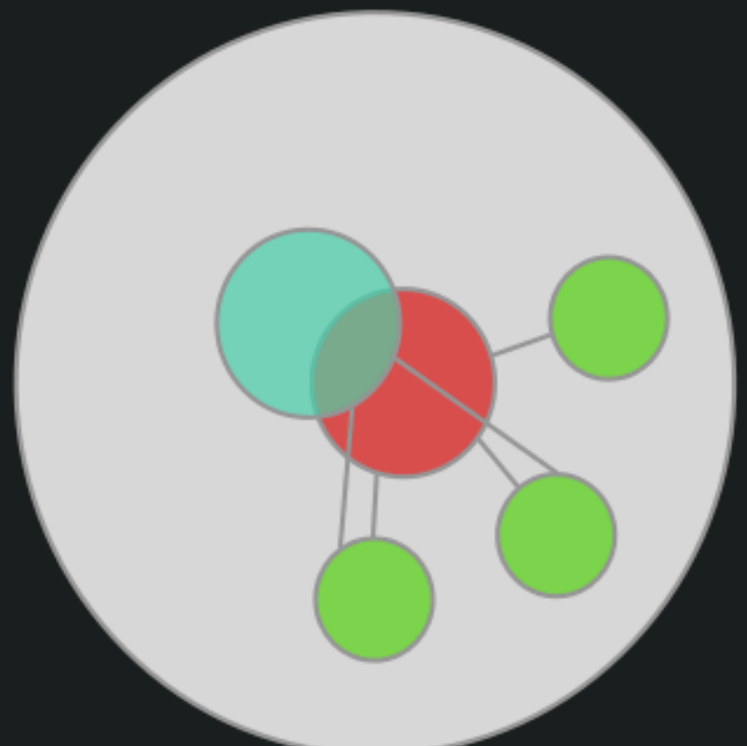
medicow
MOBILE MANAGED CARE


SAMSUNG
10:36
aktuell
Ulm
heute
morgen
4 °C
Navigator
S Planner
S Memo
Uhr
Google
Kontakte
WhatsApp
Xabber
Kamera
Telefon
Nachrich...
E-Mail
Chrome
Menü

KORTRIJK RESCUE





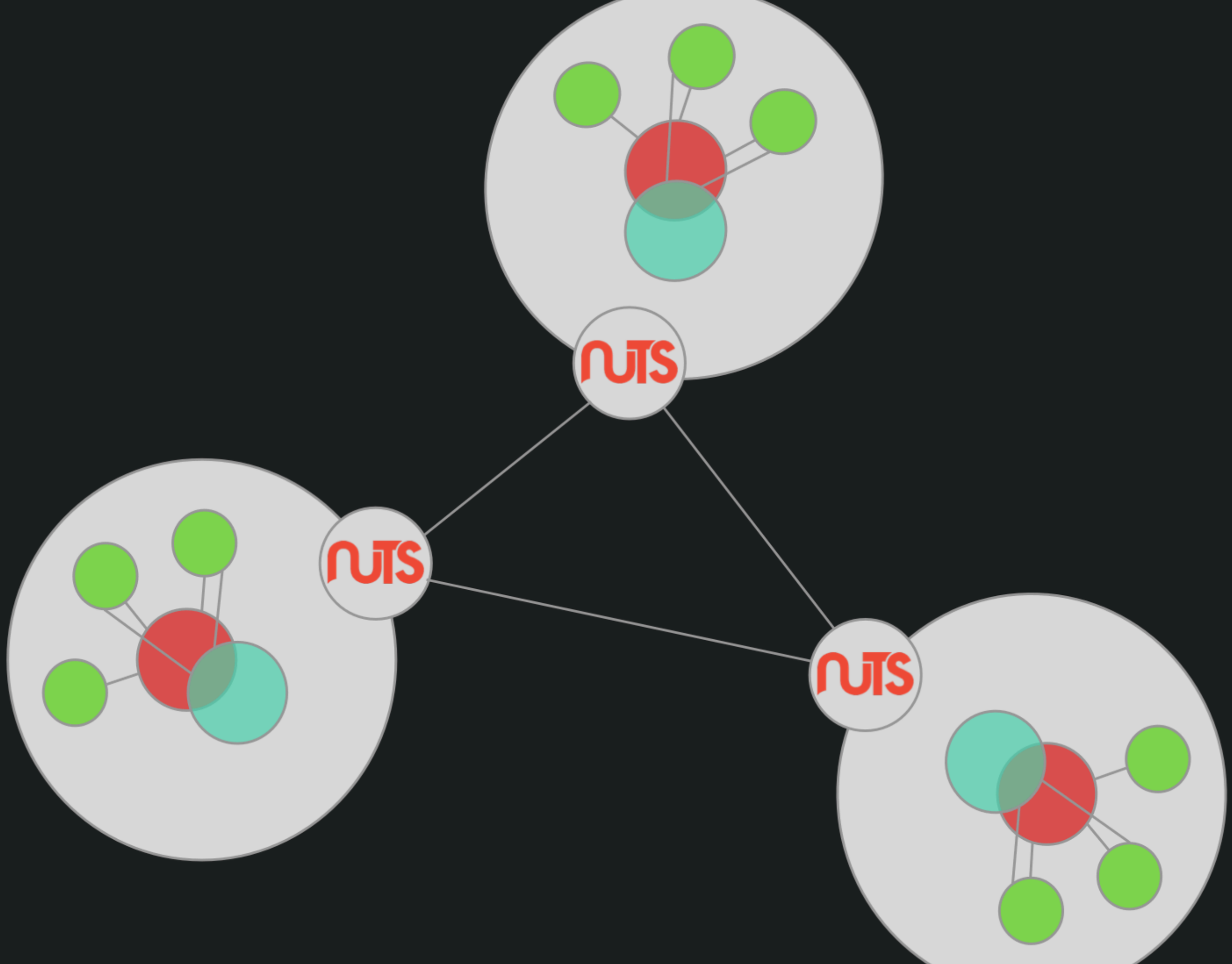


STOP
COPY
FAX
START

- Lots of small networks around a disease, financial flow, between vendors, regions etc.

- It is difficult to do it correct

- Standards are very broad but also incomplete



Hospital

Dit is een mooi stukje tekst wat we Kunnen gebruiken Als voorbeeld

Daarnaast is

EHR

API's

2way TLS over Internet

HomeCare

Dit is een mooi stukje tekst wat we Kunnen gebruiken Als voorbeeld

Daarnaast is

API's

Functionality

Dossier | Chat | Medication | Calendar

Data Standards

HL7 FHIR | Matrix | CDA | iCal

Trust

Auth | Discovery | Consent | Logging

Internet

No medical data over the Nuts network, all p2p

Everything is encrypted

Data only exchaged with relevant parties

What is Nuts?

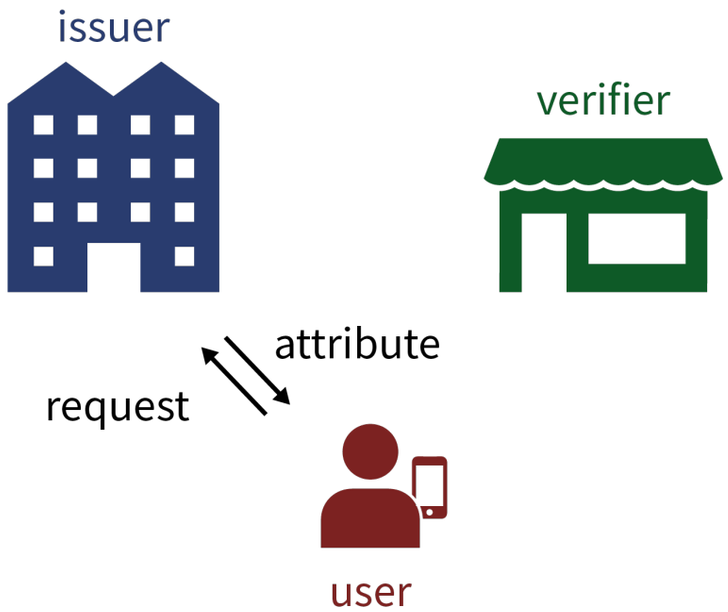
Nuts is a toolbox to secure all conditions needed for safe (medical) data exchange

1. Who is knocking (**identity**)
2. Where to knock (**discovery** / **registry**)
3. Is patient OK? (**consent, legal basis**)
4. What happened? (**Logging / audits**)

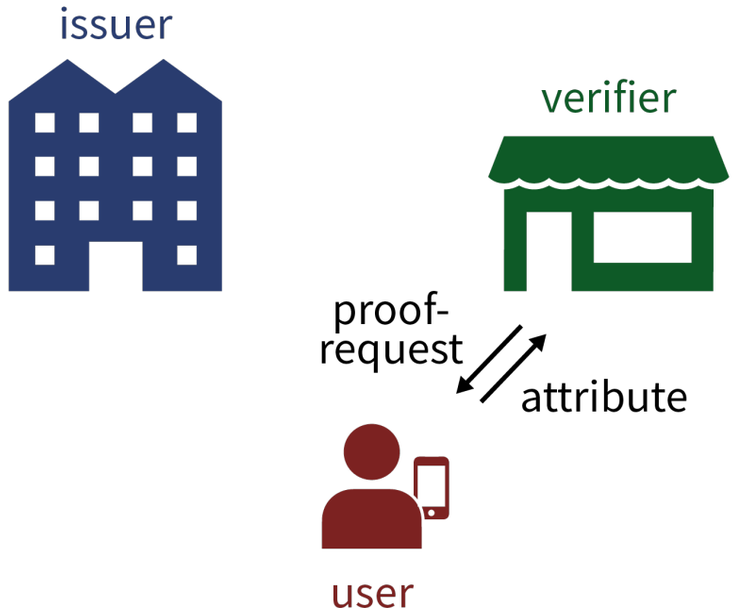
Decentralized Identity

- I Reveal My Attributes
- Secure offline channel from trusted issuer to verifier
- Able to sign contracts

IRMA


issuer
verifier
attribute
request
user

nuts


issuer
verifier
proof-
request
attribute
user

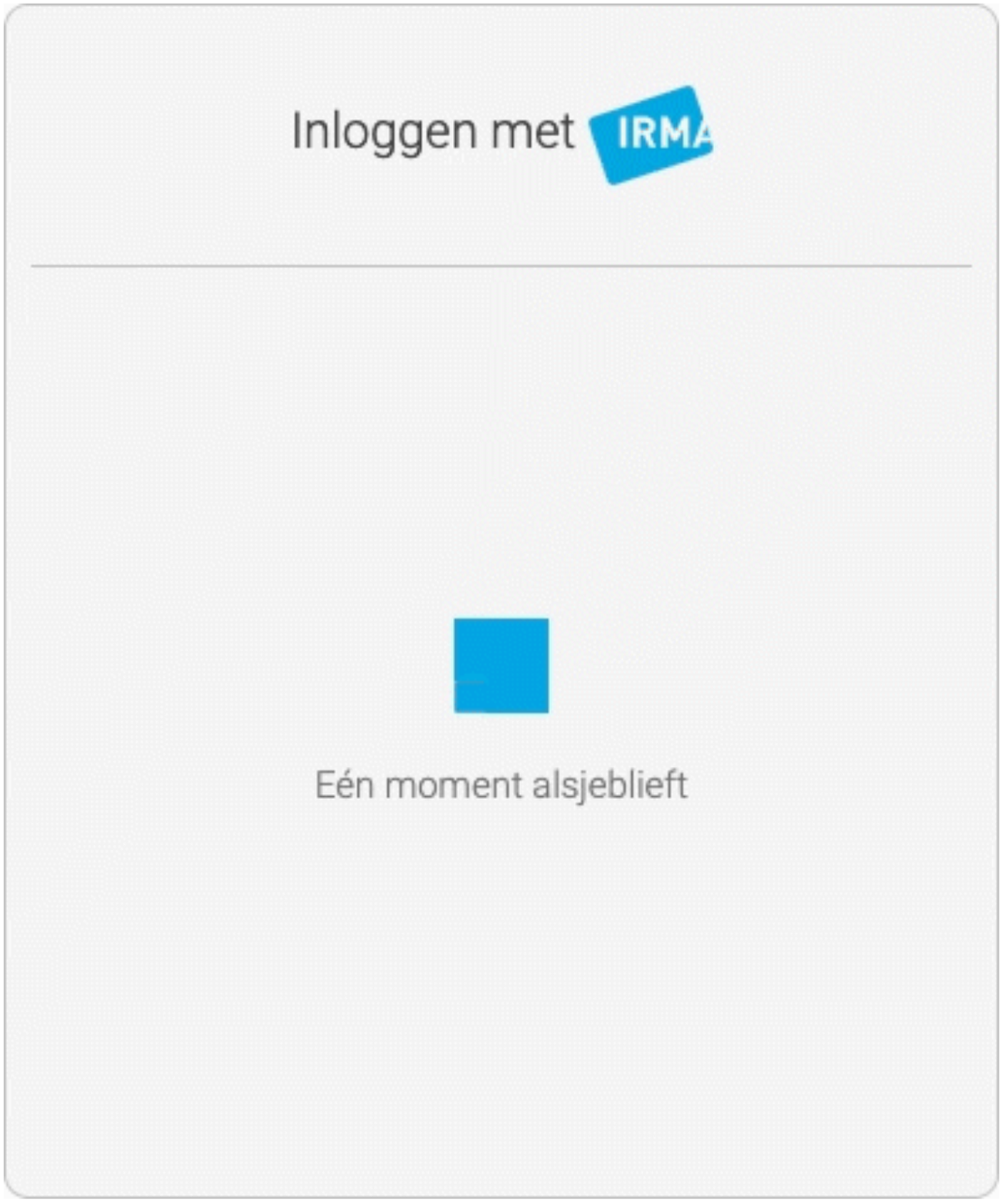
```
$ curl -X POST \
http://localhost:11323/api/consent \
-H 'Content-Type: application/json' \
-d '{
  {
  "type"  "PractitionerLogin"
  "language"  "EN"
  "version"  "v1"
  "legalEntity"  "Hospital East"
  "valid_from"
"2020-02-02T14:32:00+02:00"
  "valid_to"  "2020-12-24T14:32:00+02:00"
}
  }]
}'
```

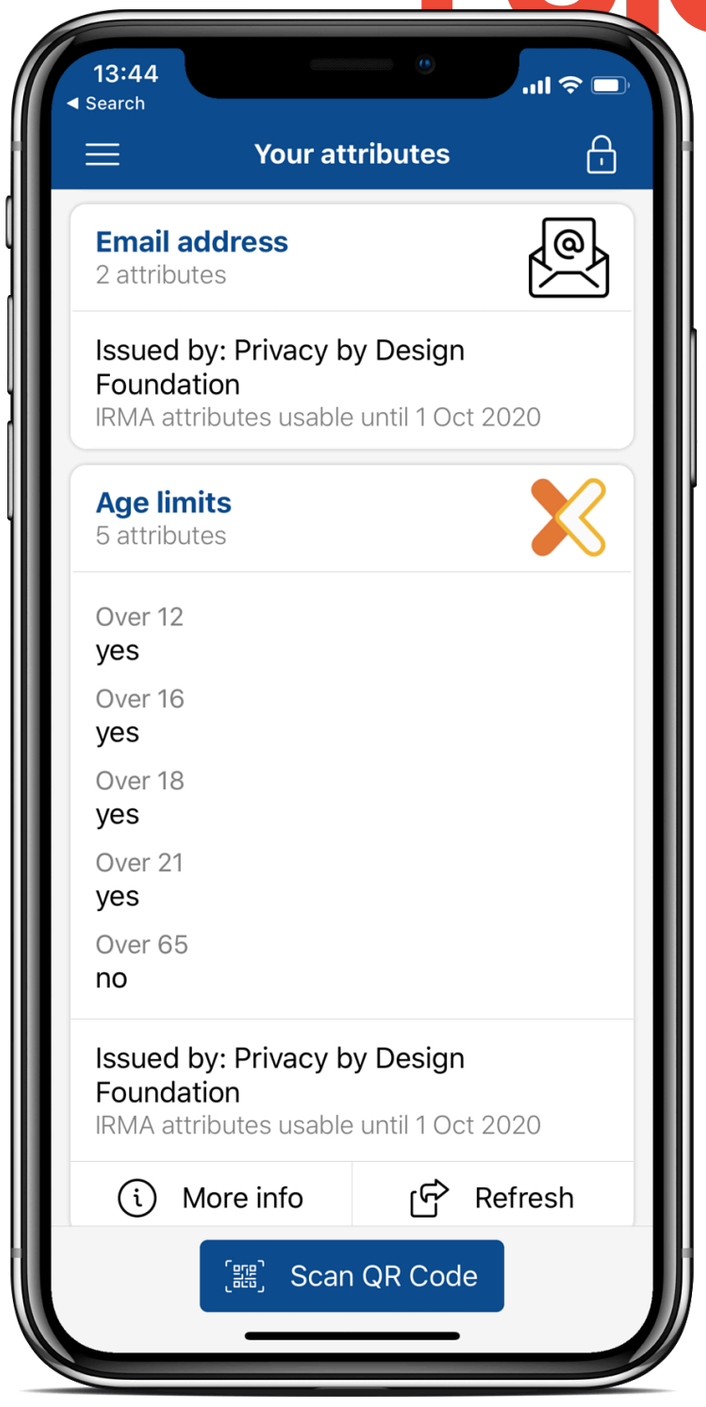
Attributes

Sign a contract

```
EN:PractitionerLogin:v1 I hereby give
permission to {{acting_party}} to make
request to the Nuts network on behalf of
{{legal_entity}}. This permission is valid
from {{valid_from}} until {{valid_to}}.
```

With the attributes: name, date of birth, medical number.


Inloggen met IRMA
Eén moment alsjeblieft


13:44
Search
Your attributes
Email address
2 attributes
Issued by: Privacy by Design Foundation
IRMA attributes usable until 1 Oct 2020
Age limits
5 attributes
Over 12
yes
Over 16
yes
Over 18
yes
Over 21
yes
Over 65
no
Issued by: Privacy by Design Foundation
IRMA attributes usable until 1 Oct 2020
More info
Refresh
Scan QR Code

Patient consent

- Make sure there is a legal basis for the data exchange
  - Explicit consent
  - Implicit following a treatment
- Consent consists of a triple:
  - Custodian of the data
  - Actor (entity who gets the permission)
  - Patient
- Limited to medical scope, period, etc.

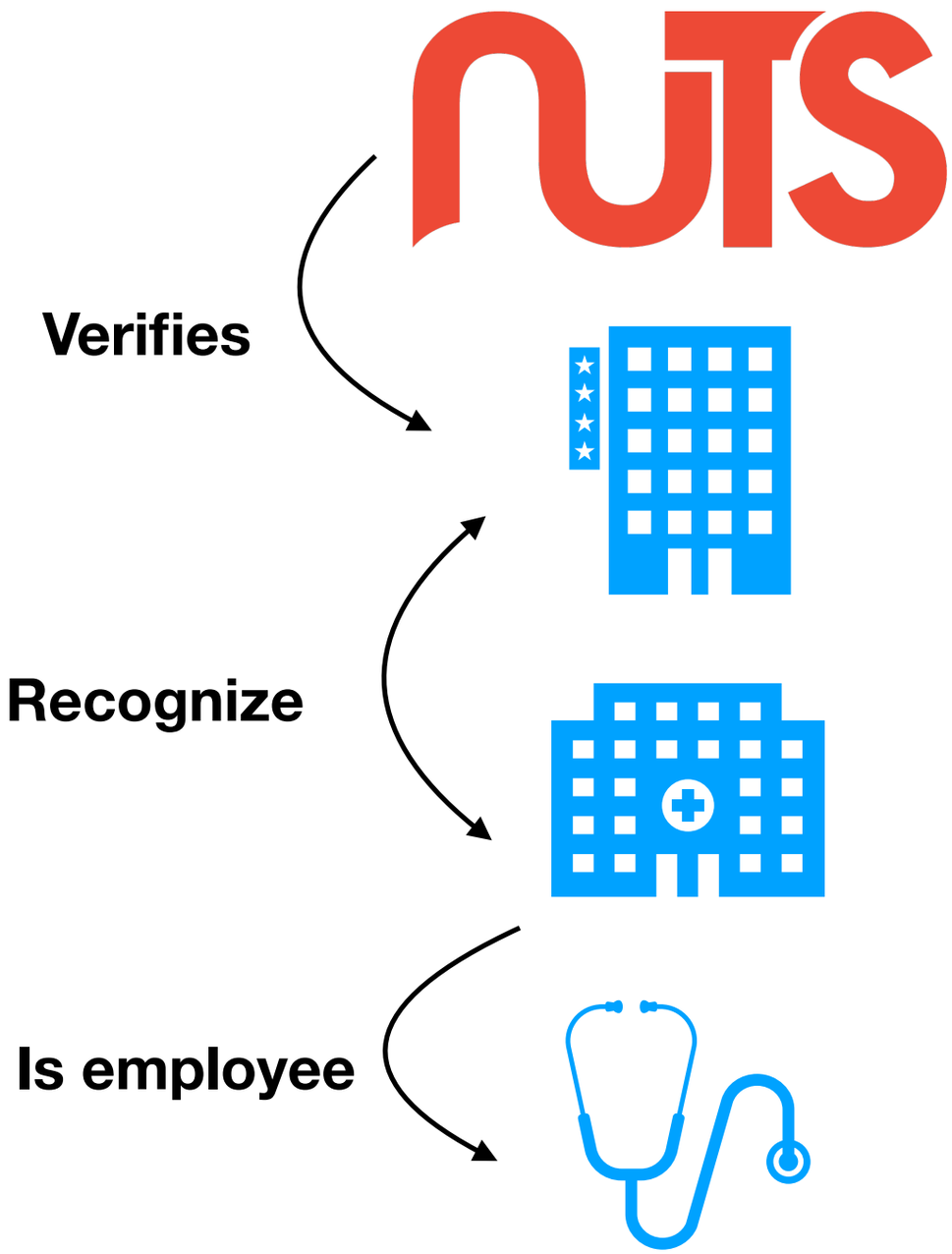
```
$ curl -X POST \
http://localhost:11323/api/consent \
-H 'Content-Type: application/json' \
-d '{
  "subject": "urn:oid:2.16.840.1.113883.2.4.6.3:99999990",
  "custodian": "urn:oid:2.16.840.1.113883.2.4.6.1:00000000",
  "actor": "urn:oid:2.16.840.1.113883.2.4.6.1:00000001",
  "performer": "urn:oid:2.16.840.1.113883.2.4.6.1:00000007",
  "records": [{
    "consentProof": {
      "ID": "11112222-2222-3333-4444-555566667777",
      "title": "Toestemming inzage huisarts.pdf",
      "URL": "https://some.url/path/to/reference.pdf",
      "contentType": "application/pdf",
      "hash": "string"
    },
    "period": {
      "start": "2019-05-20T17:02:33+10:00",
      "end": "2019-11-20T17:02:33+10:00"
    },
    "dataClass": [
      "urn:oid:1.3.6.1.4.1.54851.1:MEDICAL"
    ]
  }]
}'
```

Distributed by Corda

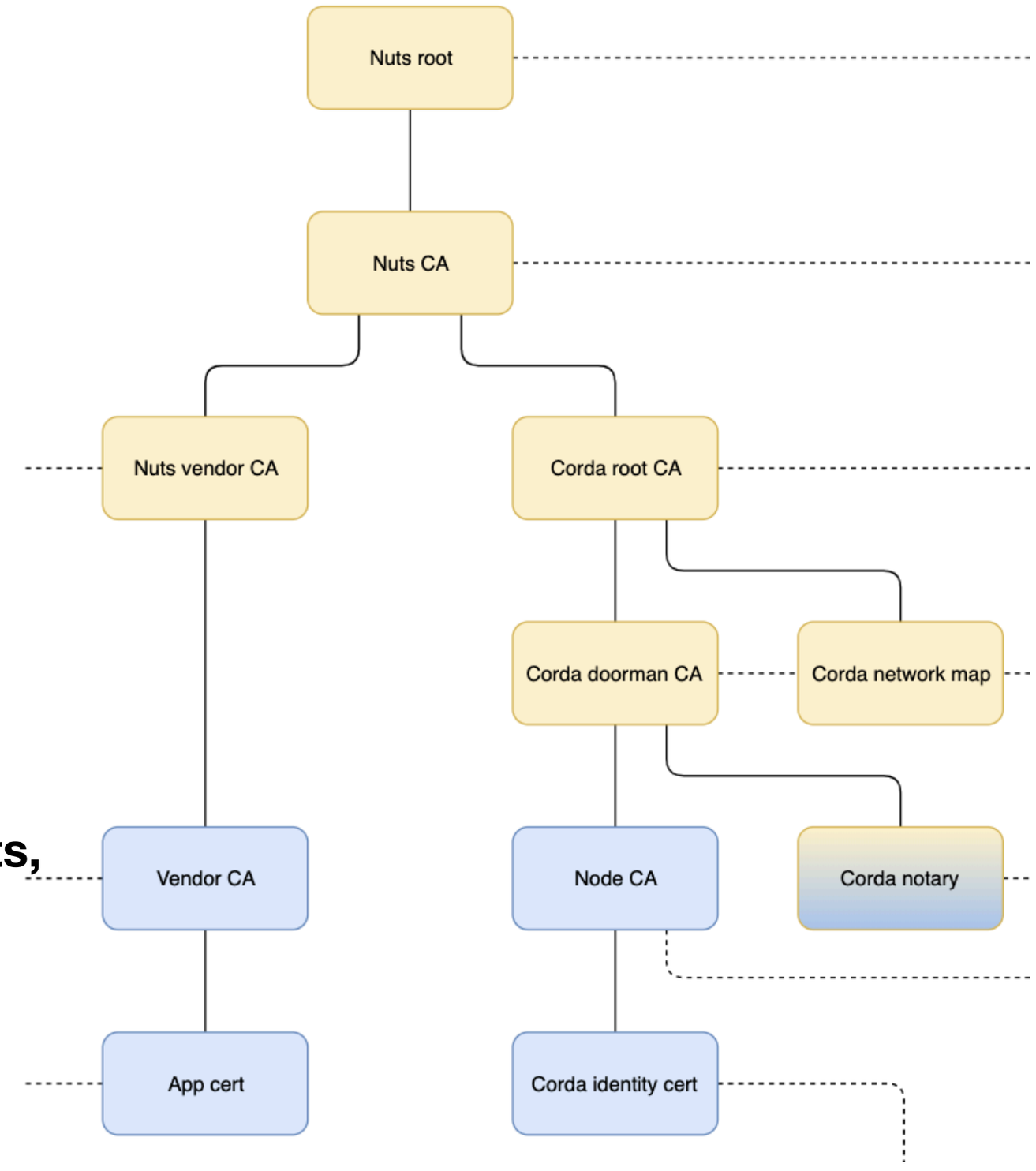
- Open source distributed trust framework
- p2p ledgers
- Uses notaries for consent
- A bit enterprisey, but it does the job

Registry

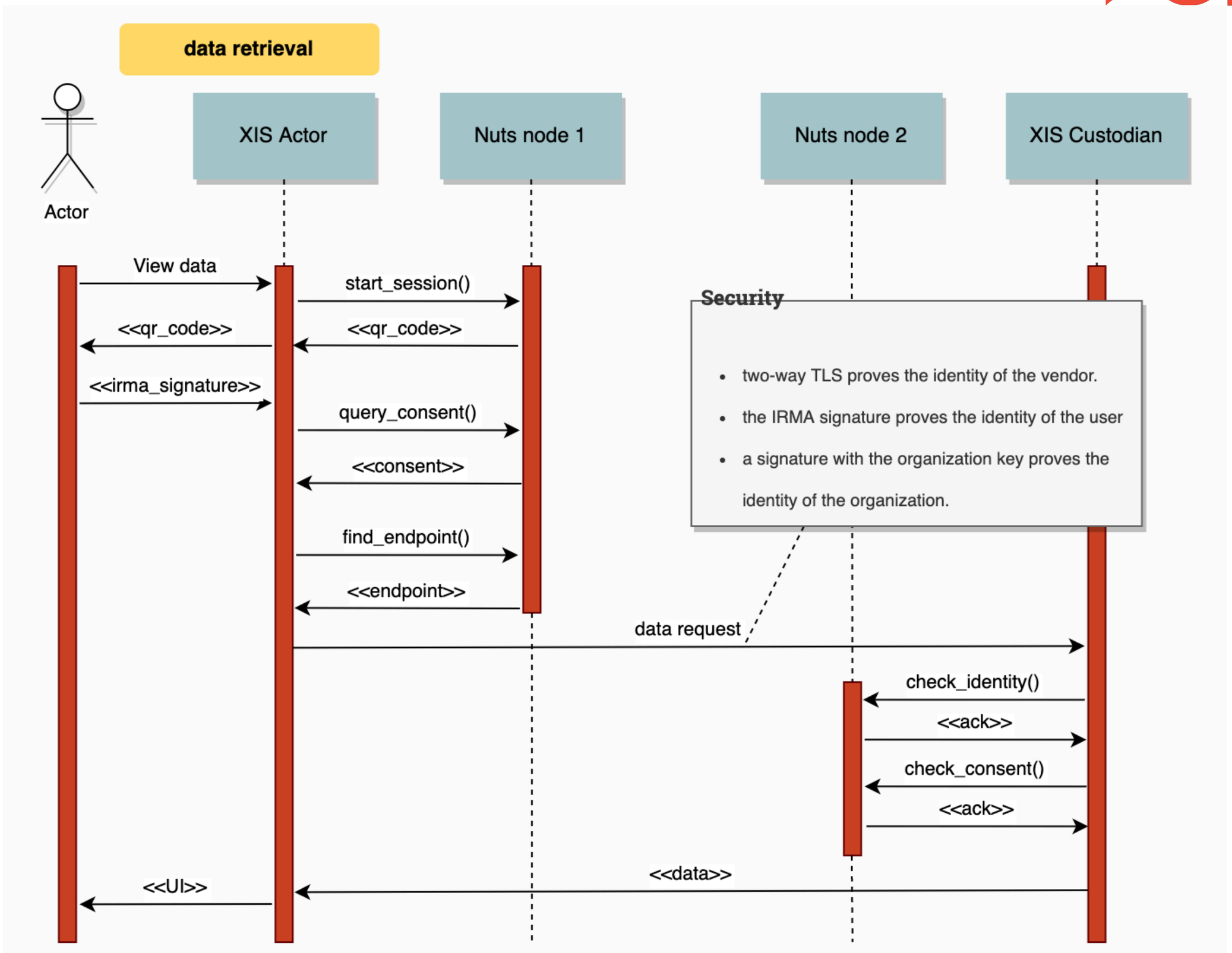
- Where to find endpoints of type "Medication" for org "Hospital"?
- What's the current public key of an org "Hospital"
- Decentralized, managed by a chain of trust


Foundation
Verifies
Software vendor
Recognize
Care provider
Is employee
Doctor

Certificate tree



Data retrieval



What's in the box?

- Decentralized Identity
- Registry with chain of trust
- Local development network
- Demo UI
- Consent distribution
- Event system using nats.io

Developer Happyness

- Easy JSON Rest api
- All APIs in OpenAPI spec
- Simple documentation (in English)
- Getting started guides
- Example code
- Everything is containerized using Docker

Demo time!

- Oh boy....

Status

- We pissed some people of
- Part of an advisory board for the Ministry of Public Health
- 4 Pre-production nodes
- Won a privacy award (yeah!)

You can help!

https://github.com/nuts-foundation

https://nuts-documentation.readthedocs.io/

nuts-foundation.slack.com

Q&A