Towards a Scalable Digital Identity

Quinten Stokkink

*Distributed Systems*
Outline

• Current Digital Identity
• Self-Sovereign Identity?
• Our work
Current Digital Identity

Digital schizophrenia:

- Companies have their own authentication.
- Companies have their own database.
- This **does not scale** beyond their own identity silo’s*.

*Unless we trust a third party with all our data.
Current Digital Identity

Annoying consequences:
• Many usernames/passwords
• Large amount of duplication of identity data

Scary consequences:
• You don’t own your phone number
• Your passport is borrowed from the state
What is Self-Sovereign Identity?

A new breakthrough solution?

• You are the source of your own identity data
• You grant access to your data
Self-Sovereign Identity

The value proposition:

- Collect evidence (attestation) from others
- No single trusted third party *required* (it scales!)
- Like PGP web of trust
Beyond theory

Implemented prototype with:

- **National Office for Identity Data**
- **IDEMIA**

Only known *passport grade* Self-Sovereign digital identity *implemented* in the world.
Legal matters

Achieving passport-level identity:

• By authorized professionals
• Through certified procedures
• Linking the citizen to the device (with biometry)
## The Architecture

Transferring identity data:
- Free and open standard
- Any data
- Any business logic

<table>
<thead>
<tr>
<th>My Identity:</th>
<th>FACE</th>
<th>AGE</th>
<th>&lt; EMPTY &gt;</th>
<th>&lt; EMPTY &gt;</th>
<th>&lt; EMPTY &gt;</th>
<th>&lt; EMPTY &gt;</th>
<th>&lt; EMPTY &gt;</th>
<th>&lt; EMPTY &gt;</th>
<th>&lt; EMPTY &gt;</th>
<th>&lt; EMPTY &gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Architecture

Transferring identity data:
- Free and open standard
- Any data
- Any business logic

Carrier made by TU Delft
The Architecture

Transferring identity data:
- Free and open standard
- Any data
- Any business logic

My Identity:

- FACE
- AGE

Attributes recognized by certified authorities
The Future

New challenges:
• Semantics
• Standardization
• Too much power
The Future

New challenges:

- **Semantics**
- Standardization
- Too much power
The Future

New challenges:

- Semantics
- Standardization
- Too much power

I only have APPL_FACE_v5

Do you have TU_ID_v120?
The Future

New challenges:
• Semantics
• Standardization
• Too much power

I’ll give you $5 for all of your info.

Ok, sure!
The Future

Benefits of a scalable identity:

• Free and open market for identity data
• Free and open market for authentication mechanisms
• Data minimization (privacy) for citizens
• Dramatic operating cost reduction
• Decentralized ecosystems
Towards a Scalable Digital Identity

Quinten Stokkink

*Distributed Systems*