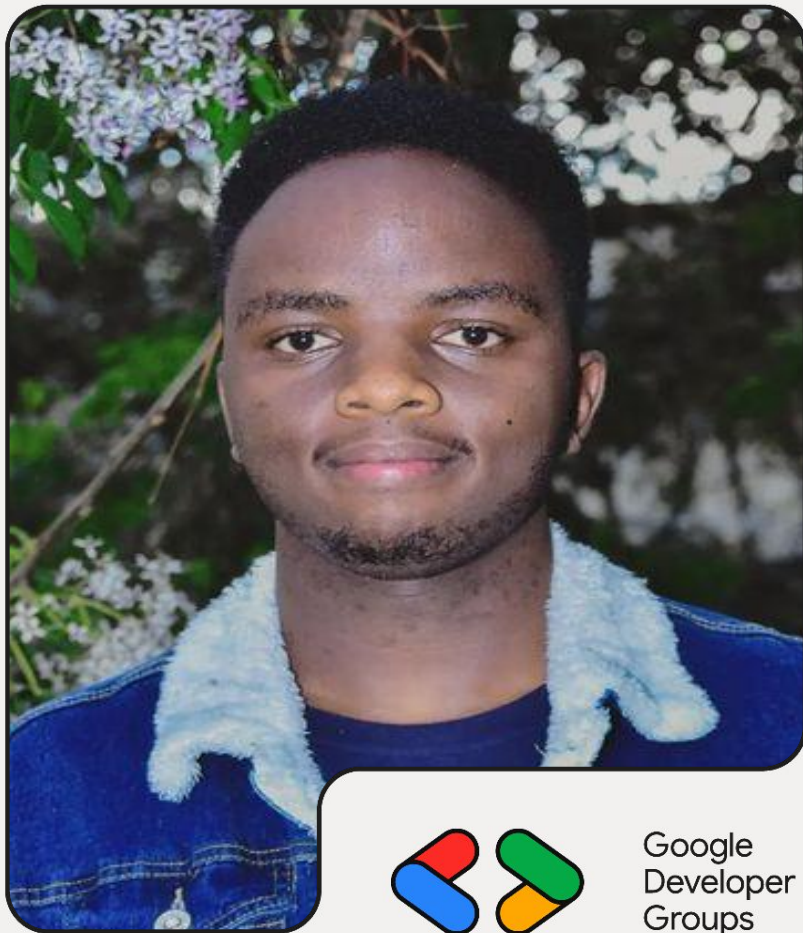


John Ndigirigi @ndigirigi__john

Self-Sovereign Identity: A Technical Deep Dive



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Presentation Outline

(1)

Identity and SSI Discussion

(2)

Demo

(3)

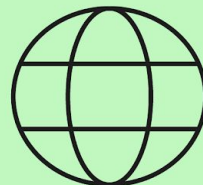
Discussion, learning, and Q&A

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Identity in Our Daily Lives



Identity

(1)

What is Identity?

(2)

What does it mean to you, what comes in your mind when you hear the word?

(3)

How do you prove identity online?

(4)

How many digital accounts do you have?

(5)

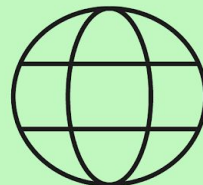
How many times did you prove your identity this month?

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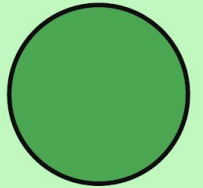
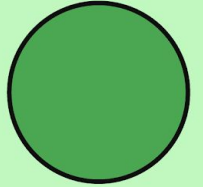
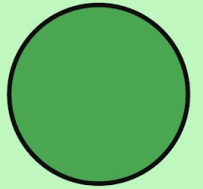
Traditional Identity Models



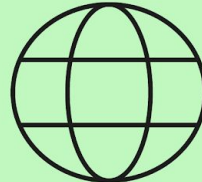


Siloed Identity

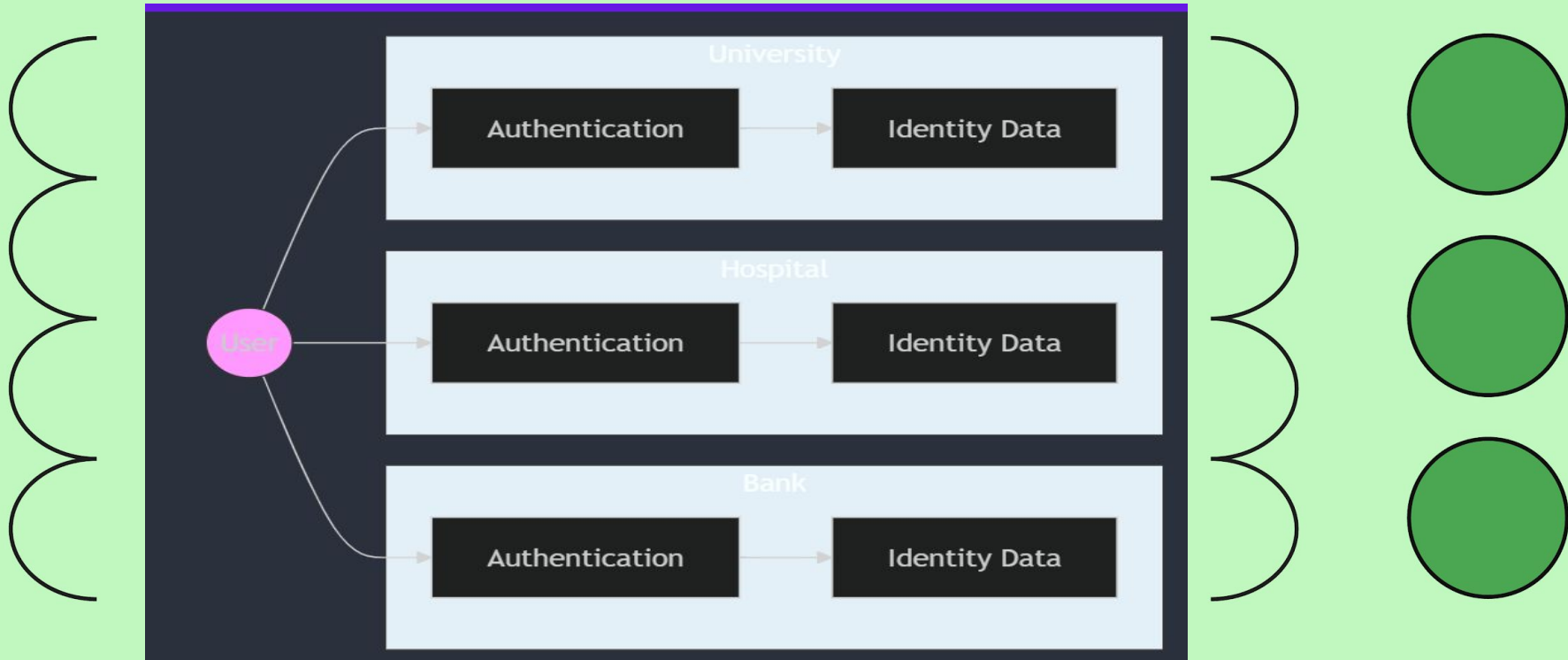
Each service maintains its own identity database



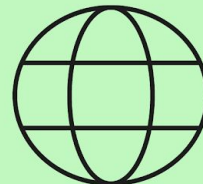
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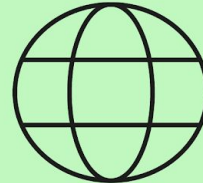
Example: Banks, hospitals, universities each storing copies.

What happens when any has a data breach?

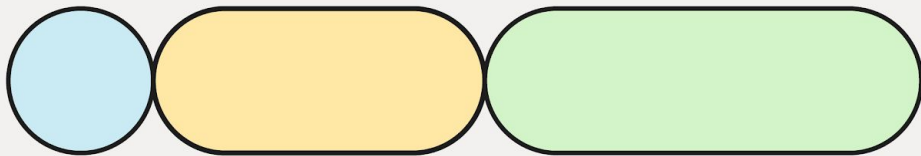
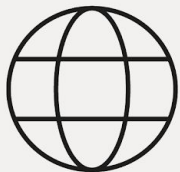
What other problems can you identify?



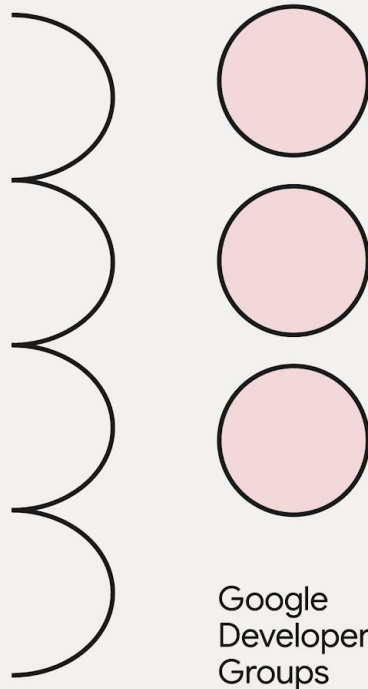
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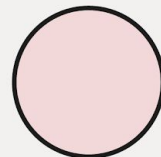
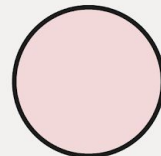
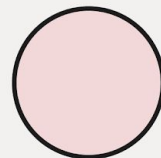
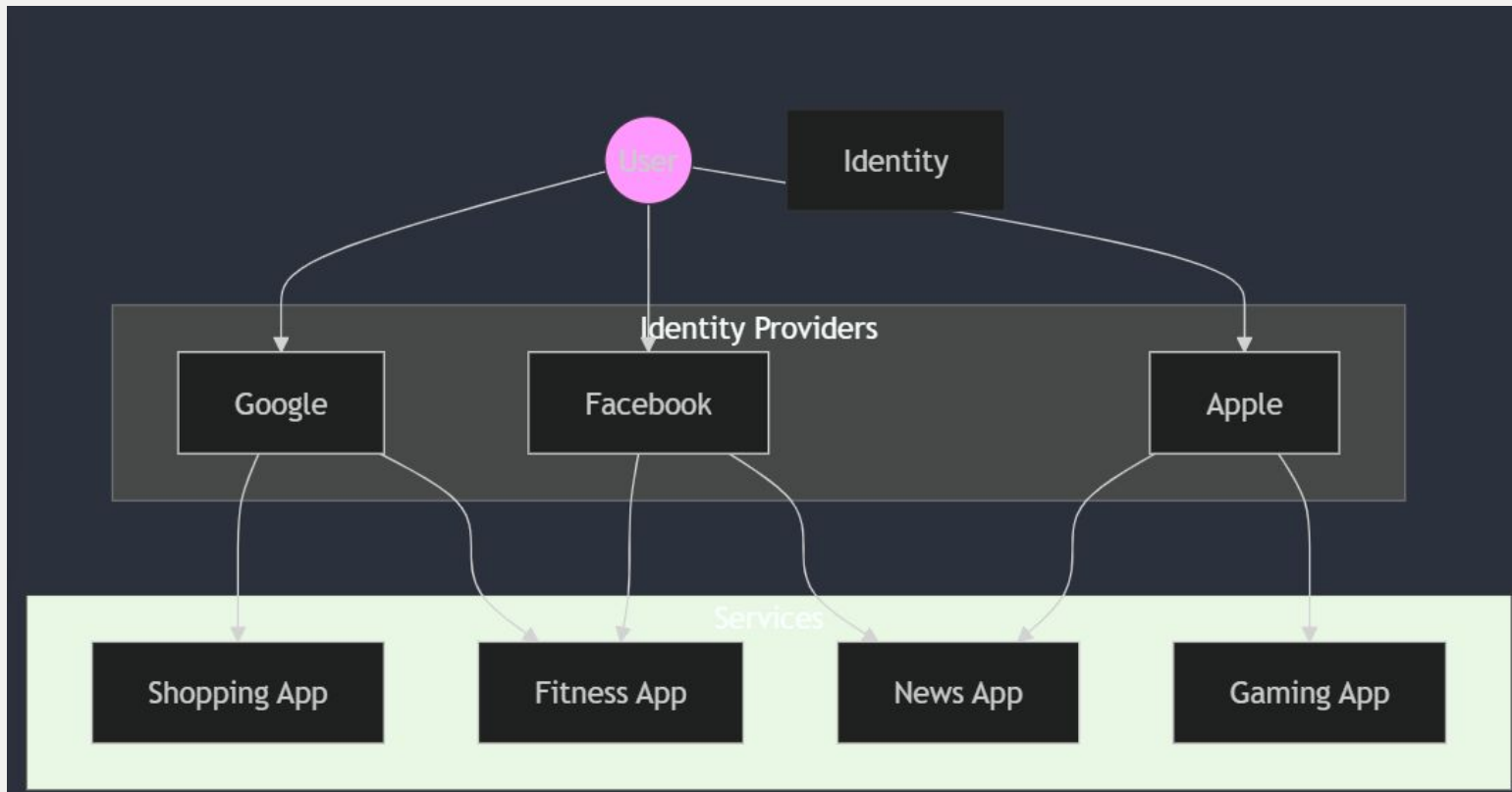
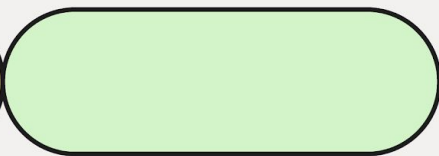
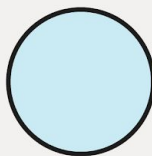
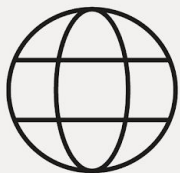


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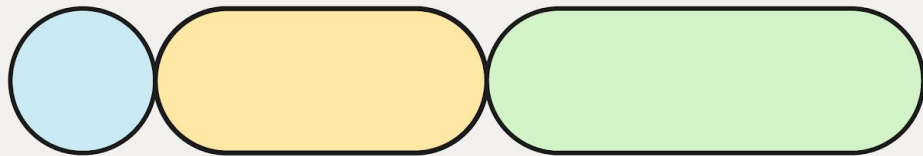
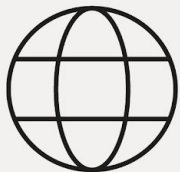


Federated Identity
Example: Login with
Google/Facebook

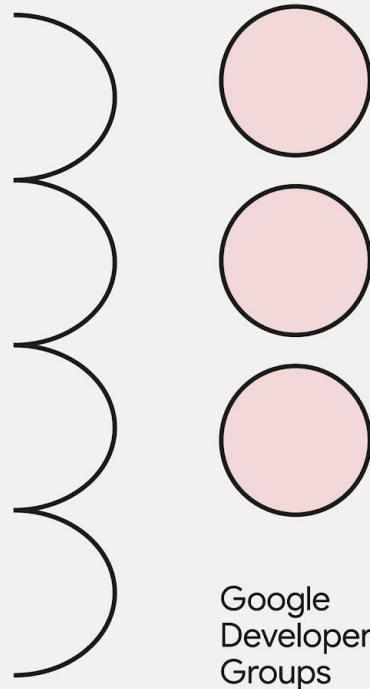




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Benefits and risks
Example: " Facebook
goes down and you
can't access other
services?"



The Identity Crisis

- Data breaches (Recent statistics)
- Identity theft cases
- Password fatigue
- Data silos
- Lack of user control

The real cost

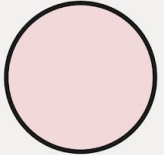
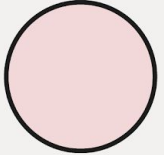
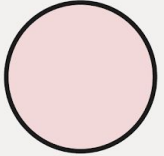
1. Time spent on verification
2. Money spent on document copies
3. Administrative overhead
4. Security risks



auritius

Not-so-fun facts:

- In 2021, almost 1 in 10 qualified nurses who were issued new licenses last year waited six months or longer before they could start working. More than a third of these 226,000 registered nurses and licensed practical nurses waited at least three months.
- Supply chain fraud is an increasingly global business risk for organizations. The Association of Certified Fraud Examiners say that 83.5% of fraud cases it surveyed in 2016 featured asset misappropriation schemes including fraudulent billing and disbursements.
- 71.1 million people fall victim to cyber crimes every year and individuals lose an average of US\$4,476.
- 96% of baby boomers, 94% of Gen X, and 93% of Gen Z don't trust social media platforms to protect their data.



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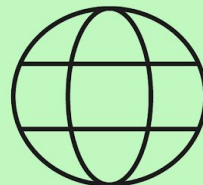
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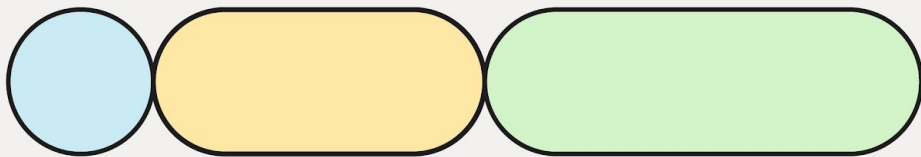
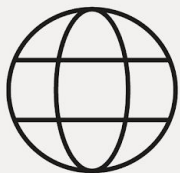


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Self-Sovereign Identity (SSI)

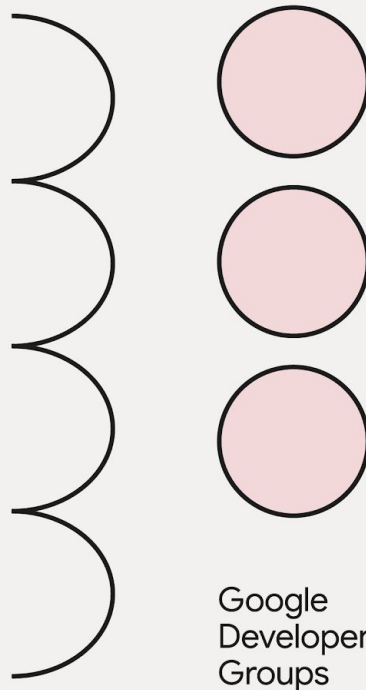
[History of SSI](#)





What is SSI?

A digital identity framework where individuals have complete control over their personal information and credentials,



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Core principles

- 1 User control and consent
- 2 Privacy by design
- 3 Portability
- 4 Transparency

The SSI Paradigm Shift

(1)


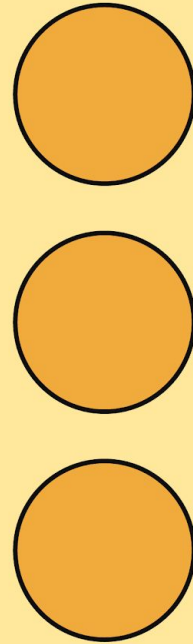
From accounts to credentials

(2)

From central to decentralized

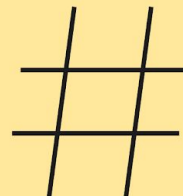
(3)

From copying to verifying

- 
- 
- 
- **Blockchain:** A decentralized database that is shared among computers in the blockchain network that records information in a way that makes it very difficult to change, hack, or cheat the system.
 - **Verifiable Credentials (VCs):** Digital cryptographically-secure versions of both paper and digital credentials that people can present to organizations that need them for verification.
 - **Decentralized Identifiers (DIDs):** Cryptographically verifiable identifiers created by the user, owned by the user, and independent of any organization. DIDs contain no personally identifiable information.

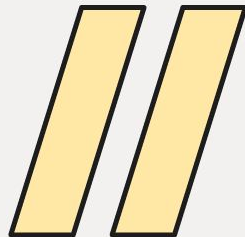
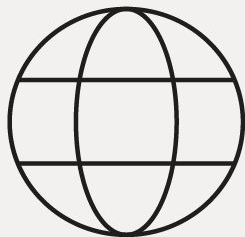
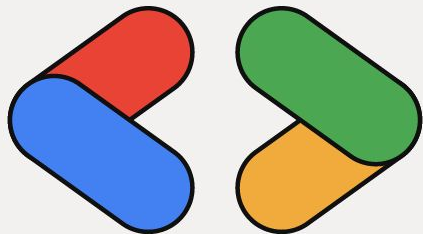


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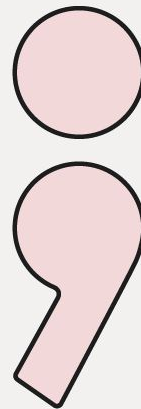


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SSI Architecture

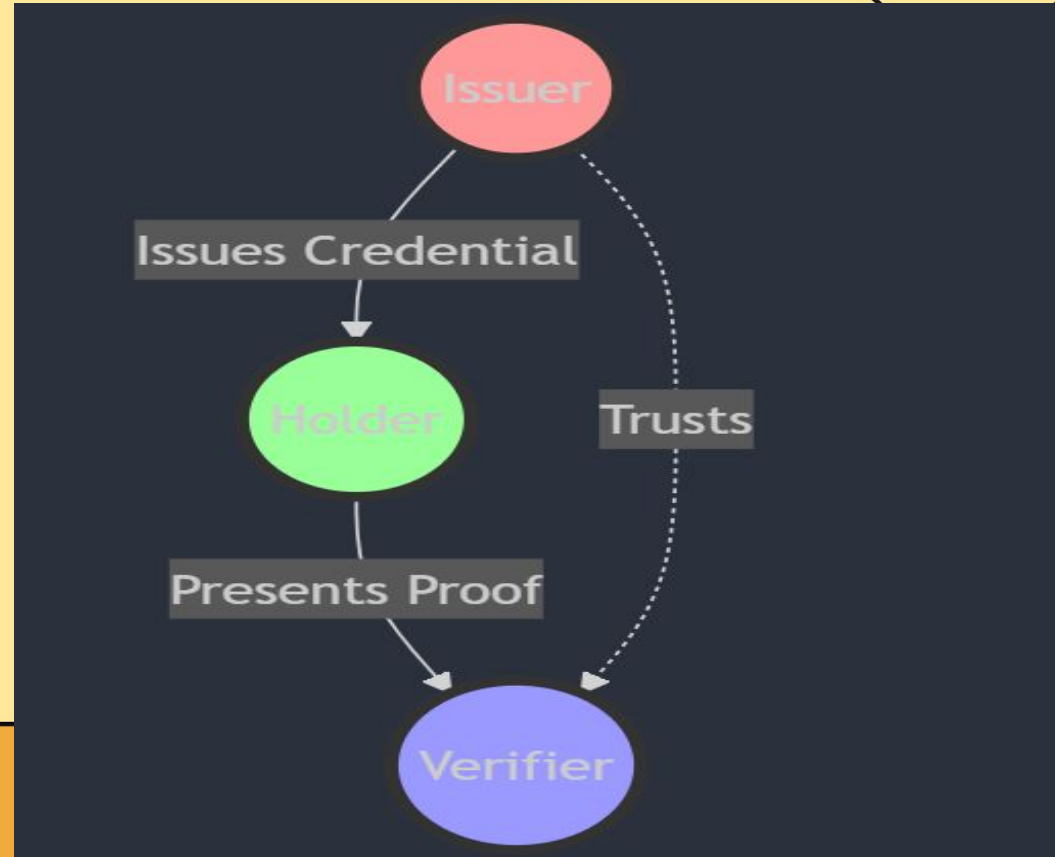


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Trust Triangle

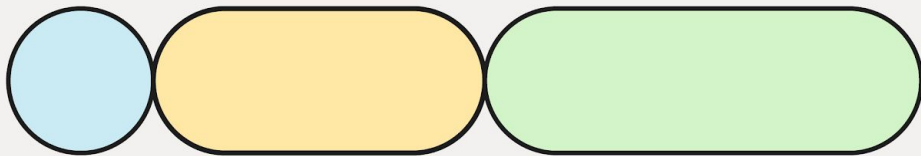
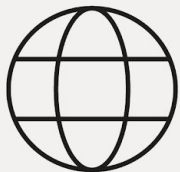
Trust Triangle

expanded-trust-triangle



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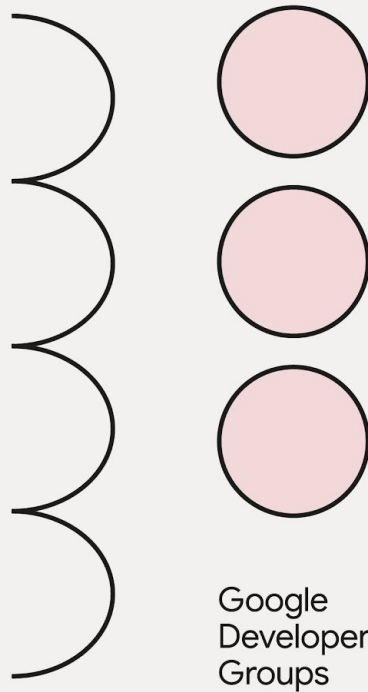
est

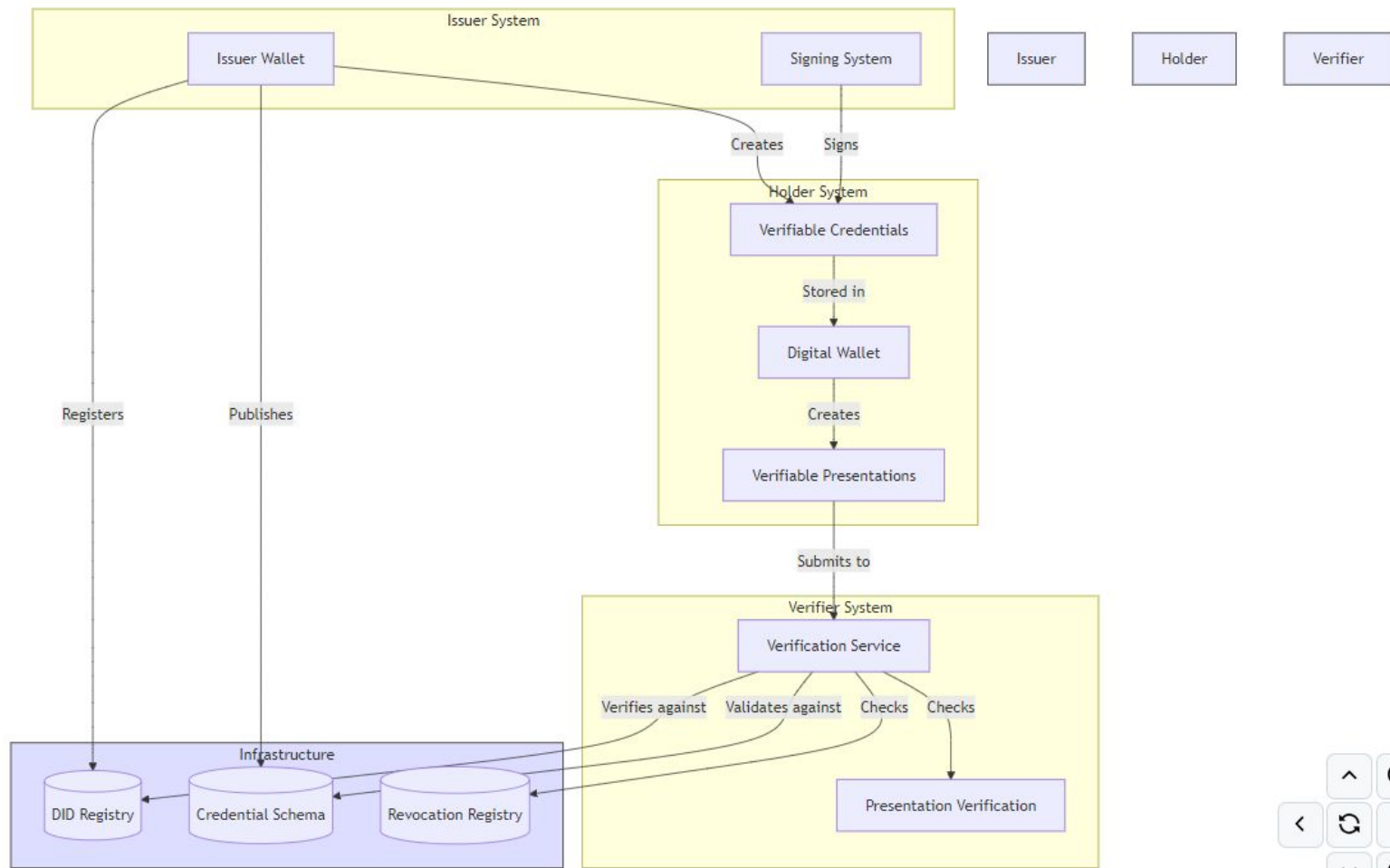


Technical Components

- DIDs (Decentralized Identifiers)
- Verifiable Credentials
- Digital Wallets
- Verification Registry

[Components diagram](#)



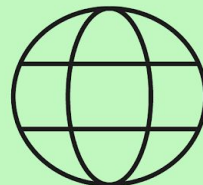



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Real World SSI Today





Government Implementations

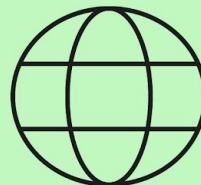
- European Union (EBSI)
- German Digital Identity
- Canadian DIACC

Corporate Adoption

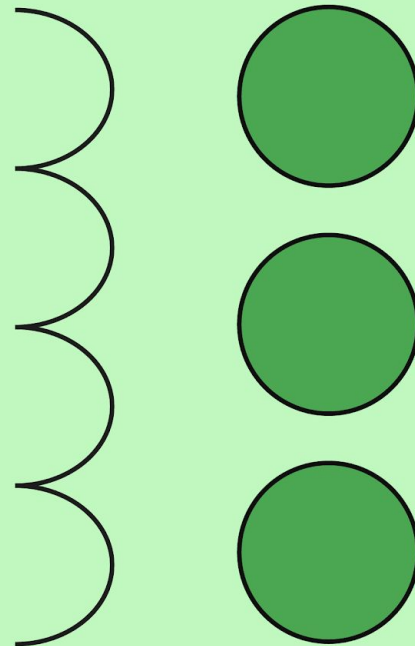
- Microsoft ION
- IBM Digital Health Pass
- Velocity Career Network

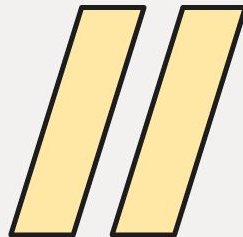
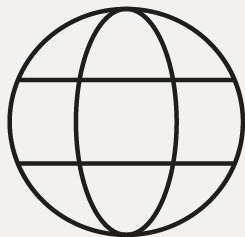
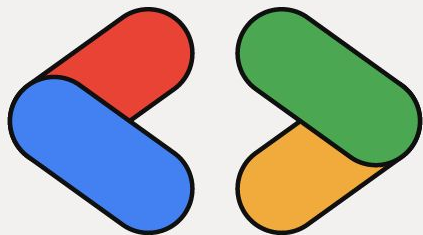


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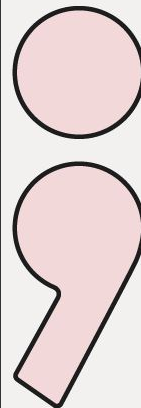
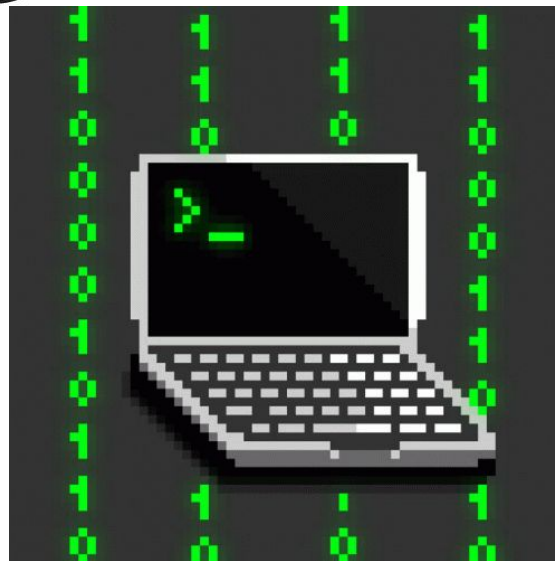


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Live Demo



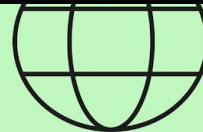
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Basic SSI Operations

- Create and resolve DIDs
- Issue a simple credential
- Verify a credential
- Show signature verification
- [Demo URL](#)



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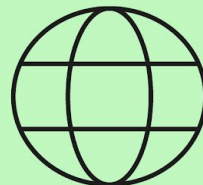
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The Technical Learning Journey

[Technical Learning Path Document](#)



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Beginner Level

- Understanding DIDs
- Basic cryptography
- Verifiable Credentials data model

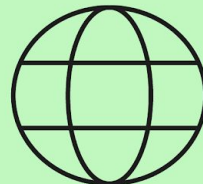
Intermediate Level

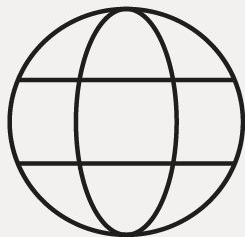
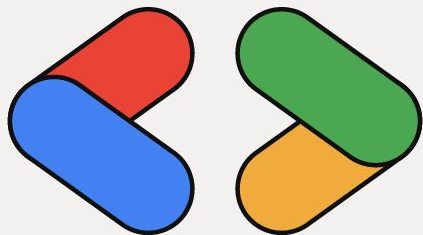
- DID methods
- Credential protocols
- Zero-knowledge proofs basics

Advanced Level

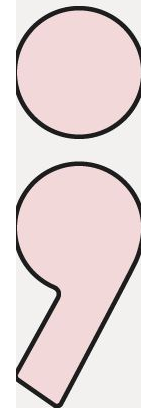
- Protocol design
- Advanced cryptography
- Governance frameworks
- Performance optimization

[Complete path](#)





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