University of Applied Sciences and Arts of Southern Switzerland
Department of Innovative Technologies
Institute of Information Systems and Networking

MSE | MASTER OF SCIENCE IN ENGINEERING

DAO on ICP:

A new paradigm for Corporate Governance

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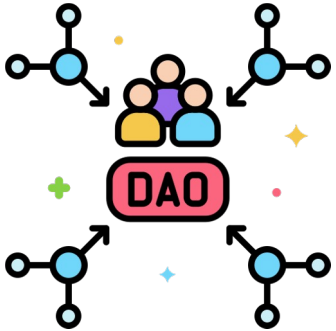
DAO

- Decentralized Autonomous Organization
- New organizational model for companies
- Community driven governance
- Advantages:
  - Rules transparent
  - Automated operations
  - Global accessibility

359

Millions of companies



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Thousands of DAOs

Why?

New technology?

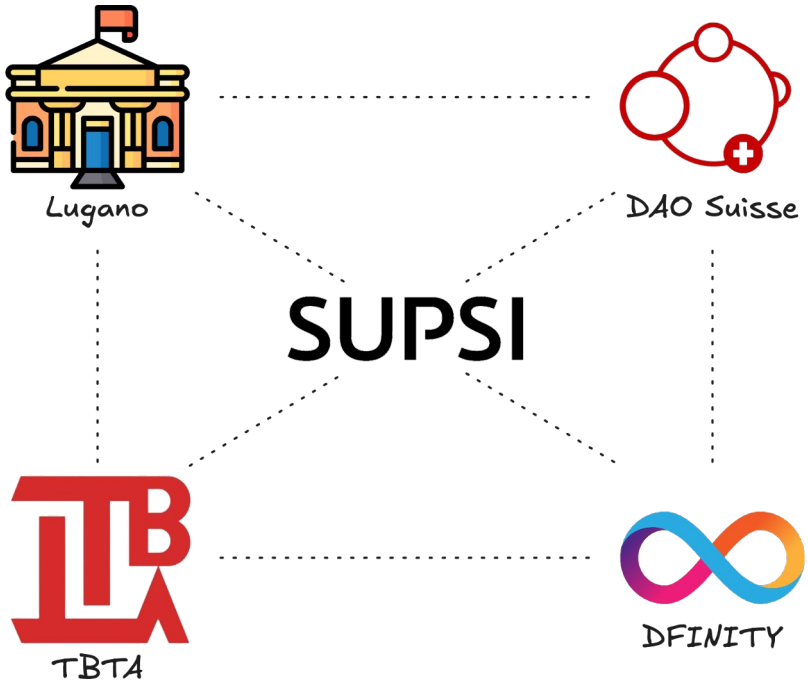
Complexity?

Legal aspects?

Motivation and context

- Applied research project
- Simplify DAO management
- Verify the legal feasibility

Stakeholders



Goal

- Platform to create and manage DAOs
- Legal compliant
- Blockchain
- Decentralization
- Real-world driven development
- Proof of Concept

Swiss legal forms

	Association	Limited Liability Company (SAGL)	Public Limited Company (SA)
Purpose	Non-economic, social/cultural	Business, SMEs	Business, large companies
Minimum capital	-	CHF 20'000	CHF 100'000
Responsibility	Members not personally liable	Limited to contribution	Limited to shares

Association - Legal constraints

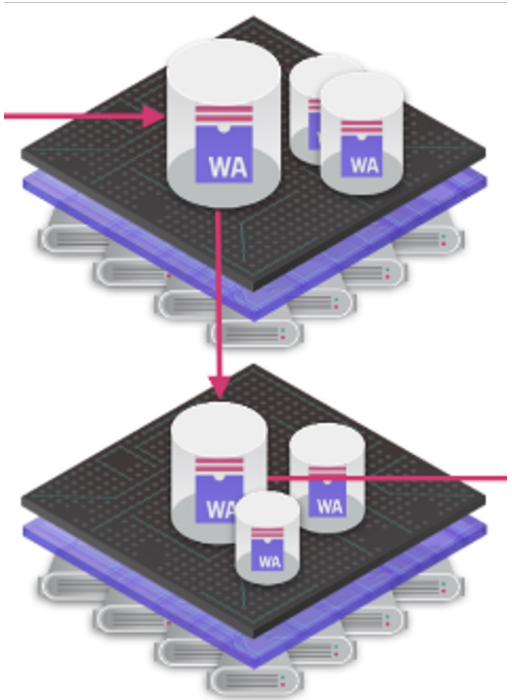
- Commercial Register
- Statutes submit
  - Creation
  - Update
- Swiss Official Gazette of Commerce (SOGC)
- Freedom in internal management

Internet Computer Protocol

- Public blockchain
- DFINITY foundation
- Replace clouds and traditional IT systems
- Network Nervous System

ICP - Architecture

- Blockchain of blockchains
- Subnets
- Nodes
- Canisters (Smart contracts)
- WebAssembly compiled
  - Natively
  - Community adapters



ICP - Key features

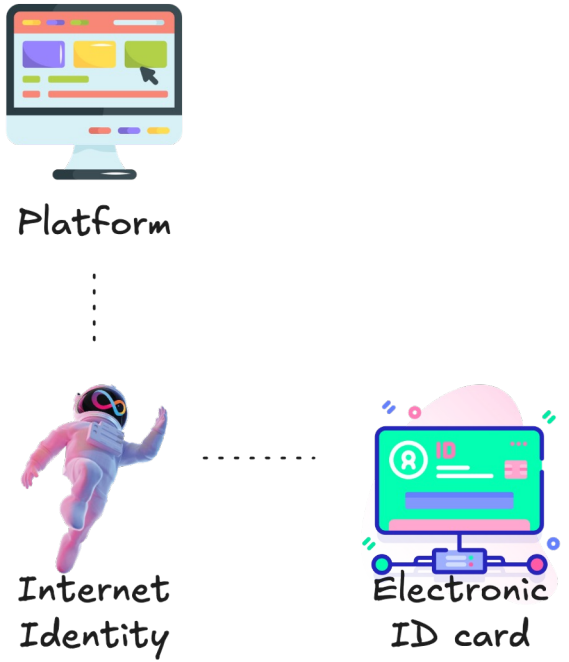
- Reverse gas model
- Data persistence and privacy
- Interoperability
- Good performance
- Scaling horizontally via subnets

Internet Identity

- Blockchain based authentication system
- Secure access on ICP
- Login with trusted devices
- Privacy oriented
- Non linkable identities

Verifiable Credentials

- Trusted digital attestations
- European eIDAS 2.0 and Swiss eID
- Internet Identity integration on July 2025
- Know Your Customer



Platform features

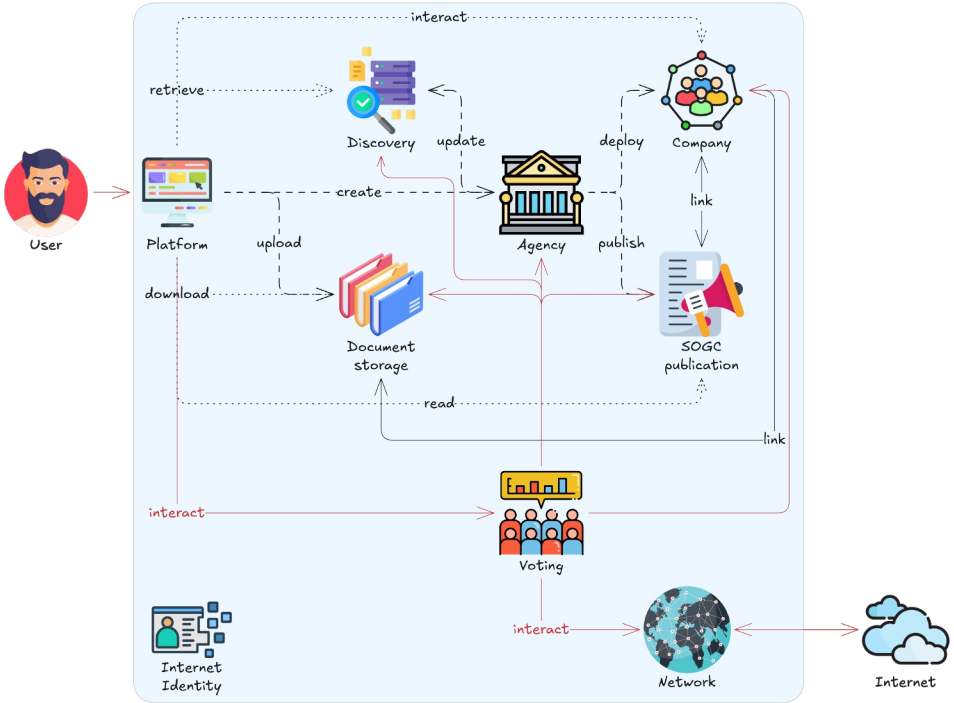
- Create DAOs
- View user and random DAOs
- Access DAOs information
- Interact with DAOs via polls
- Manage polls from creation to result validation

System requirements

- Flexibility
- Interoperability
- Compliance with Swiss laws
- Automation and verifiability of actions
- User experience
  - Performance
  - Accessible to common users
- Full data management
- Transparency of full-stack

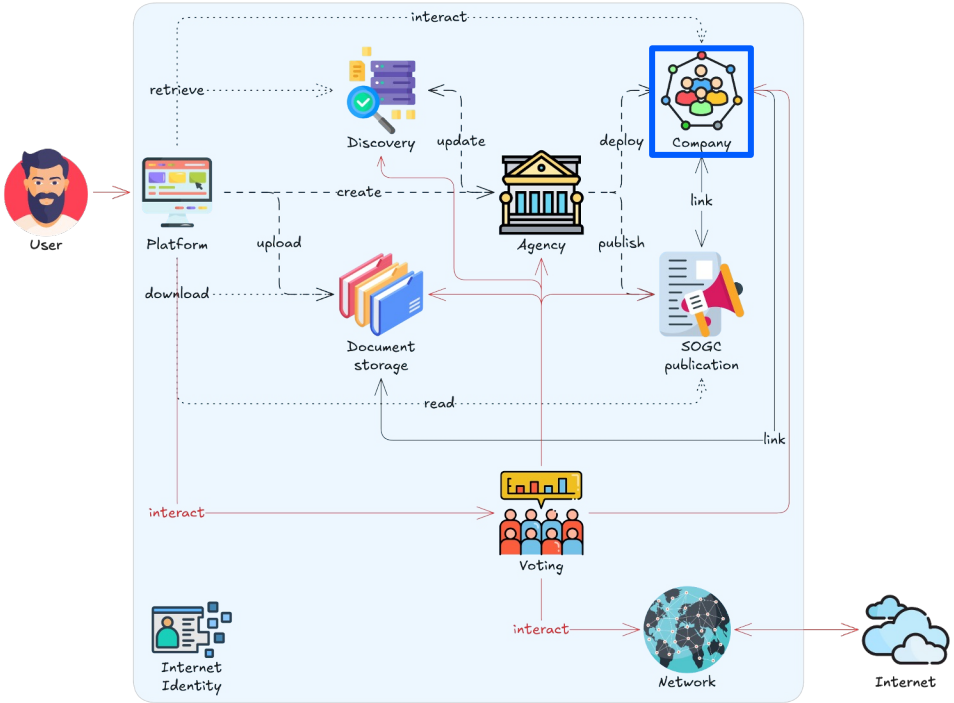
Platform architecture

- 8 canister types
- Modular design
- Separation of Concerns
- Risk of centralization
- Single responsibility
- ICP hosted



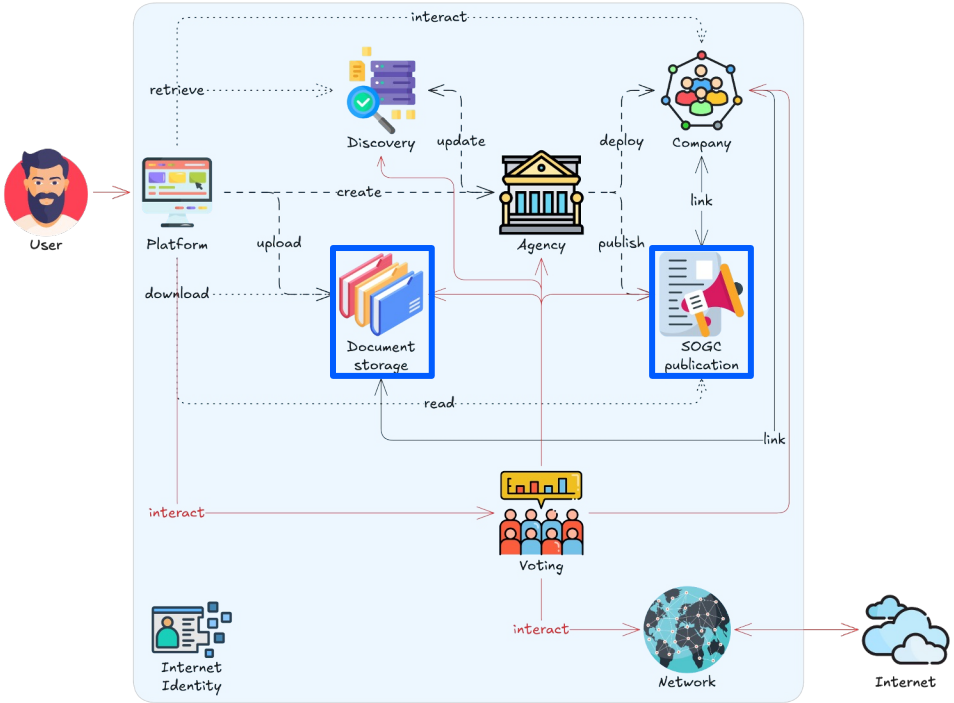
Company

- Represent legal form
- Association
- Contain simple data
- Encapsulate operations
- Interchangeable



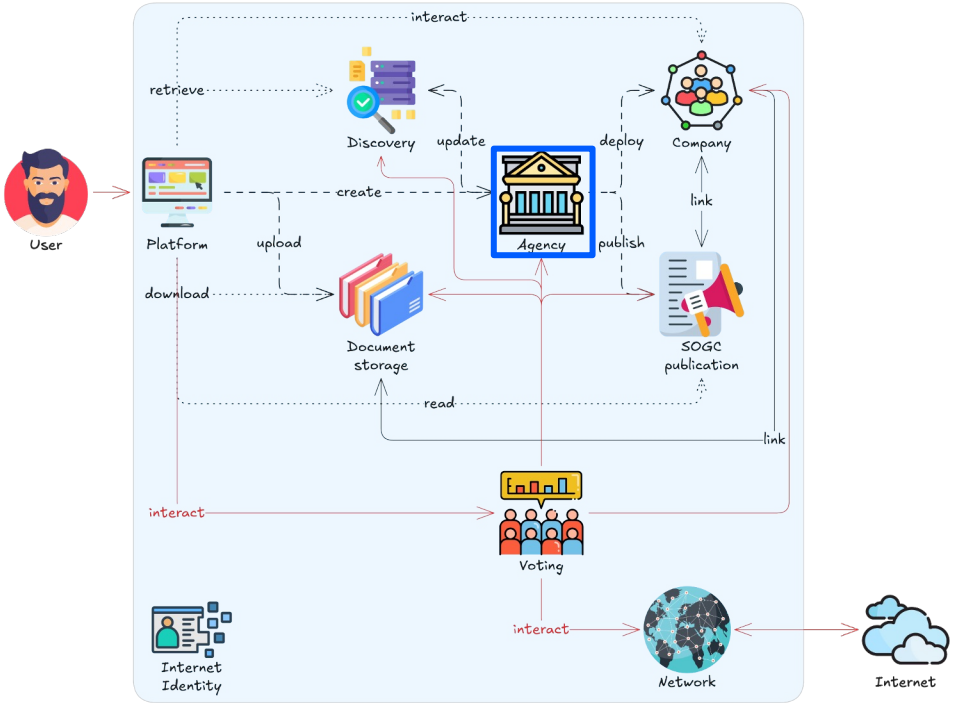
Storages

- Shared canisters
- Append only
- Contain complex data



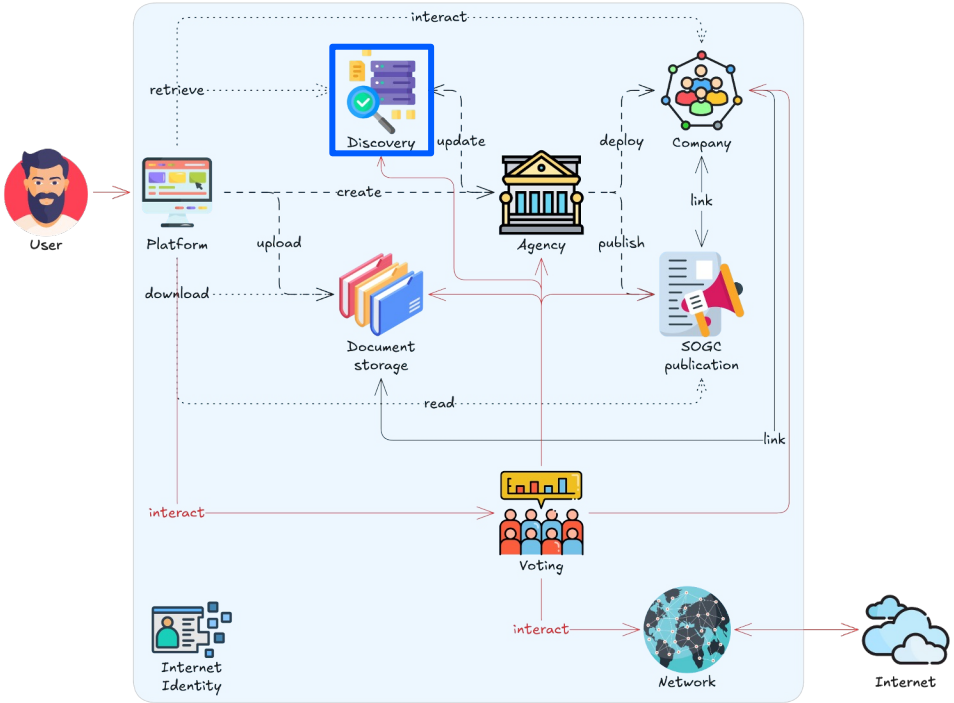
Agency

- Create DAO
- Manage legal forms
- Perform setup
- Change legal form



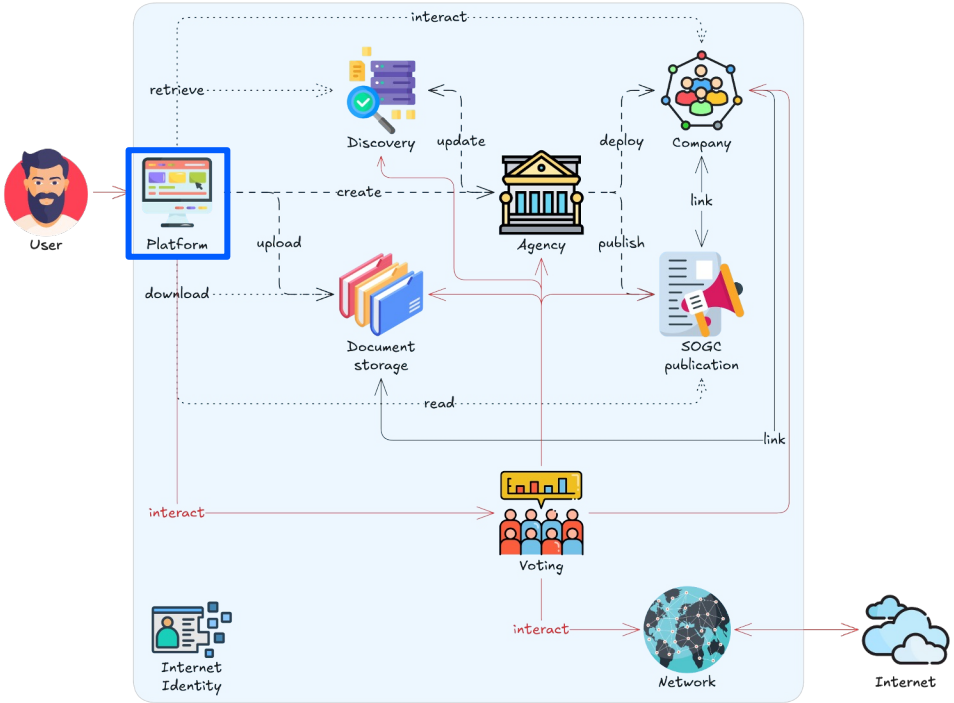
Discovery

- Registry
- Map users – DAOs
- Platform utility
- Random DAOs



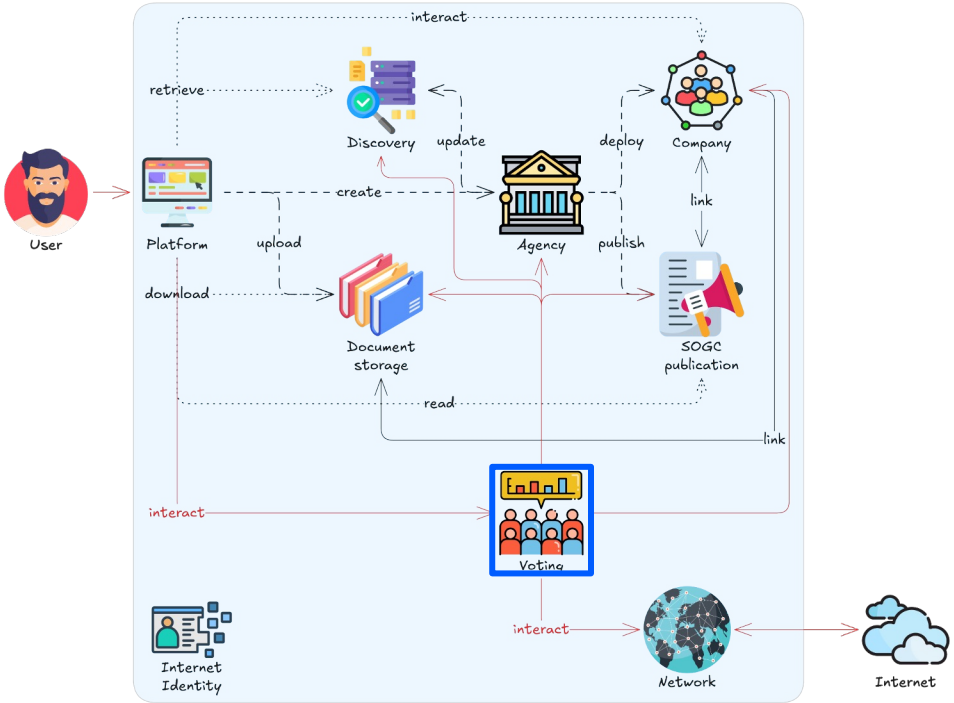
Platform

- Frontend host
- User interactions



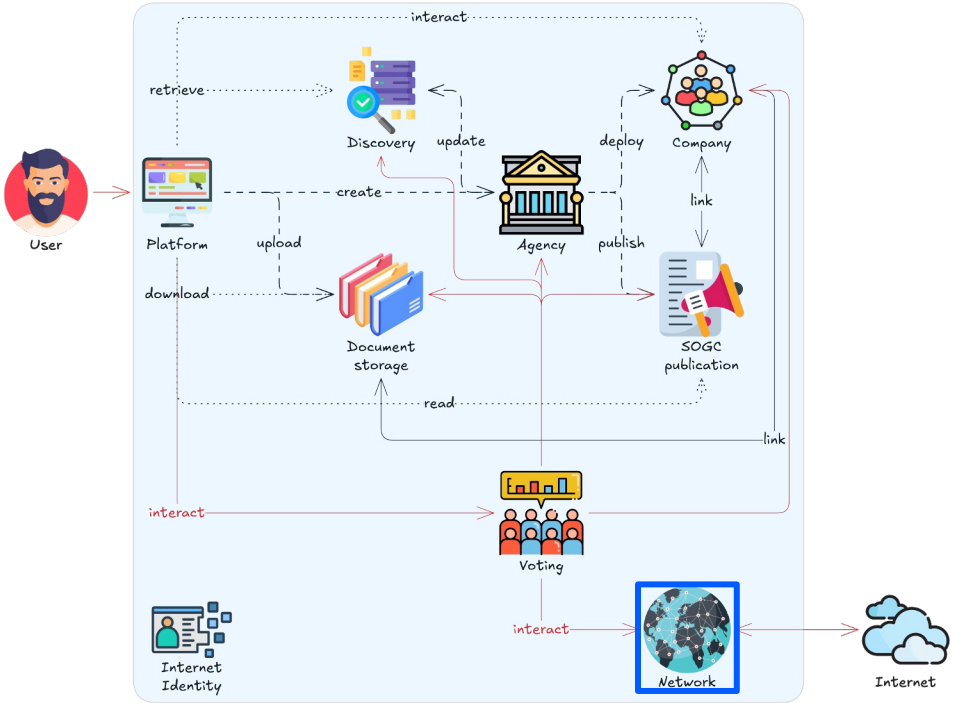
Voting

- Shared canister
- Manage DAO polls
- Creation
- Configure action
- Track voting process
- Execute action
- Validate the result

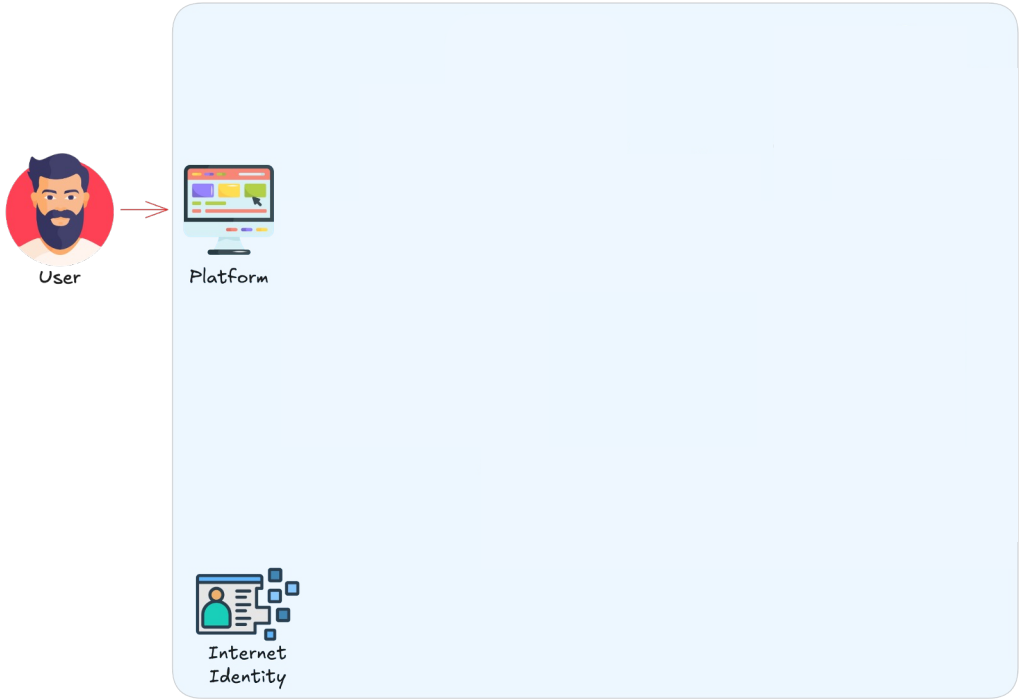


Network

- External contact point
- Wrapper HTTPS outcall
- Abstraction for common operations



Workflow - DAO creation



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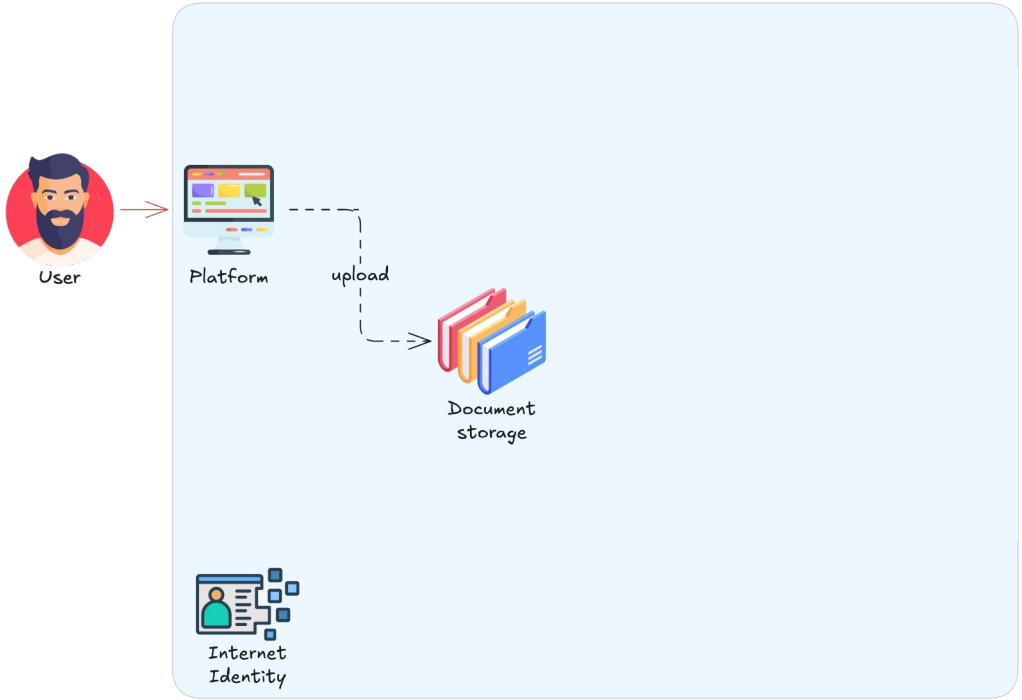

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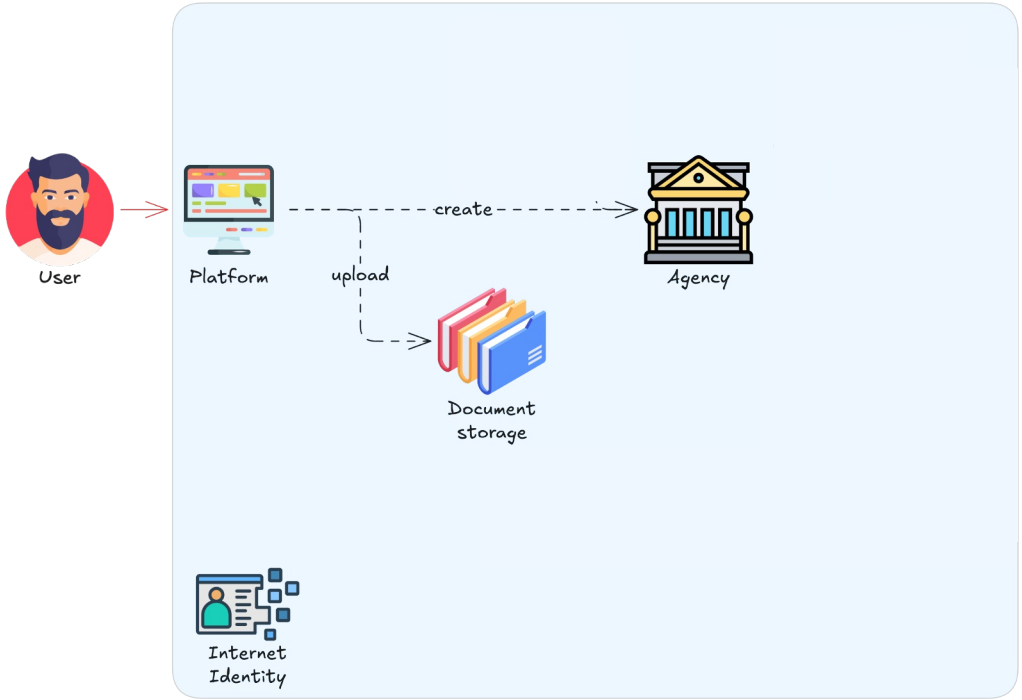

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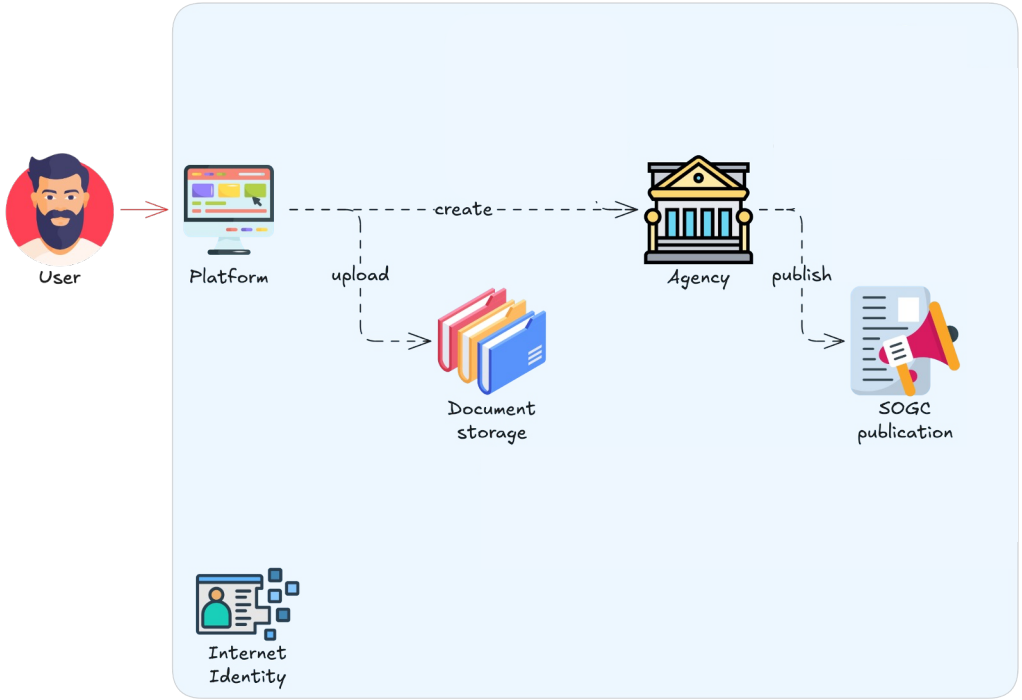

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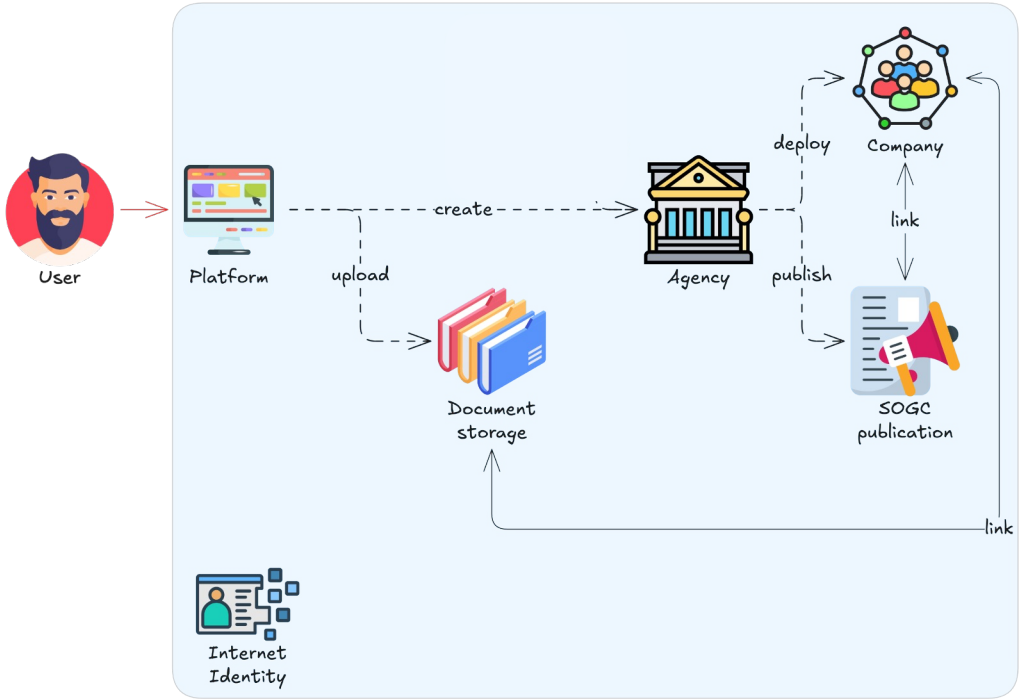

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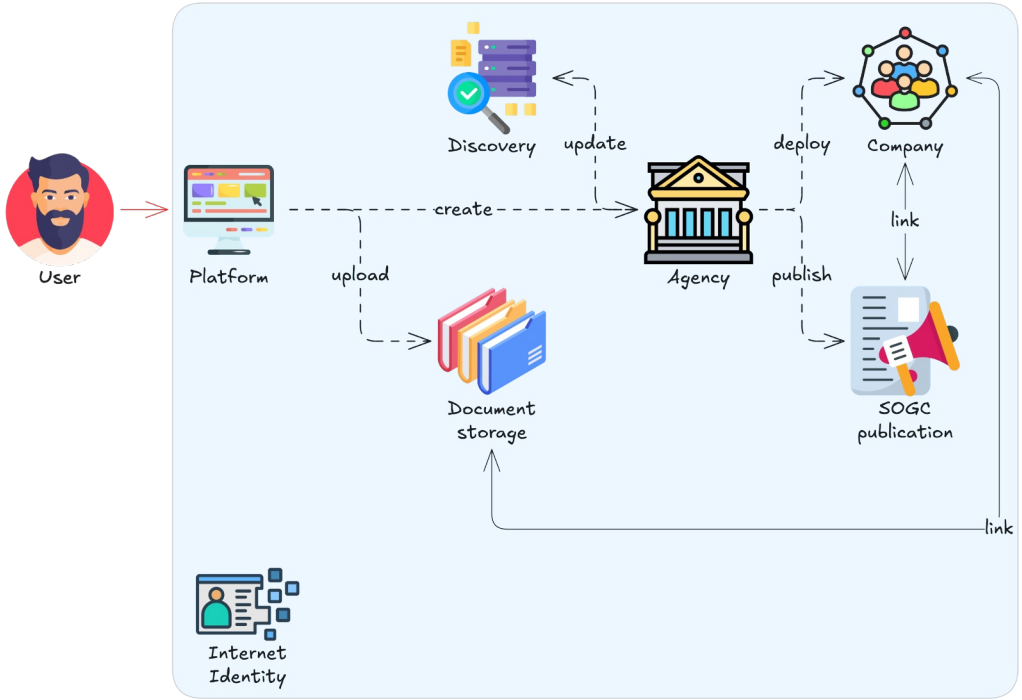
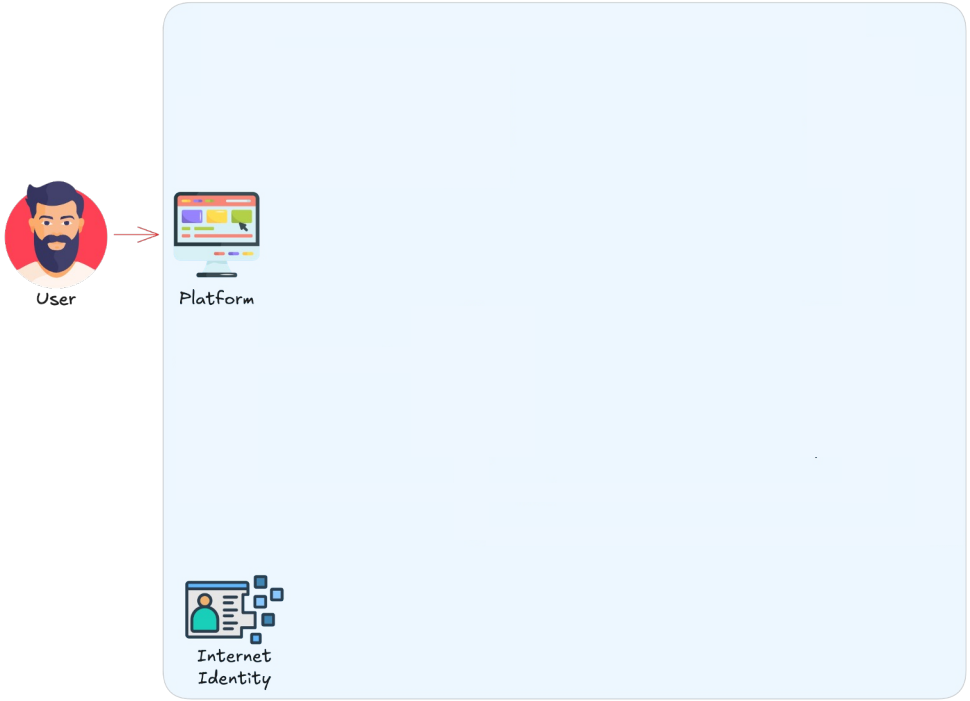


Workflow - DAO discovery



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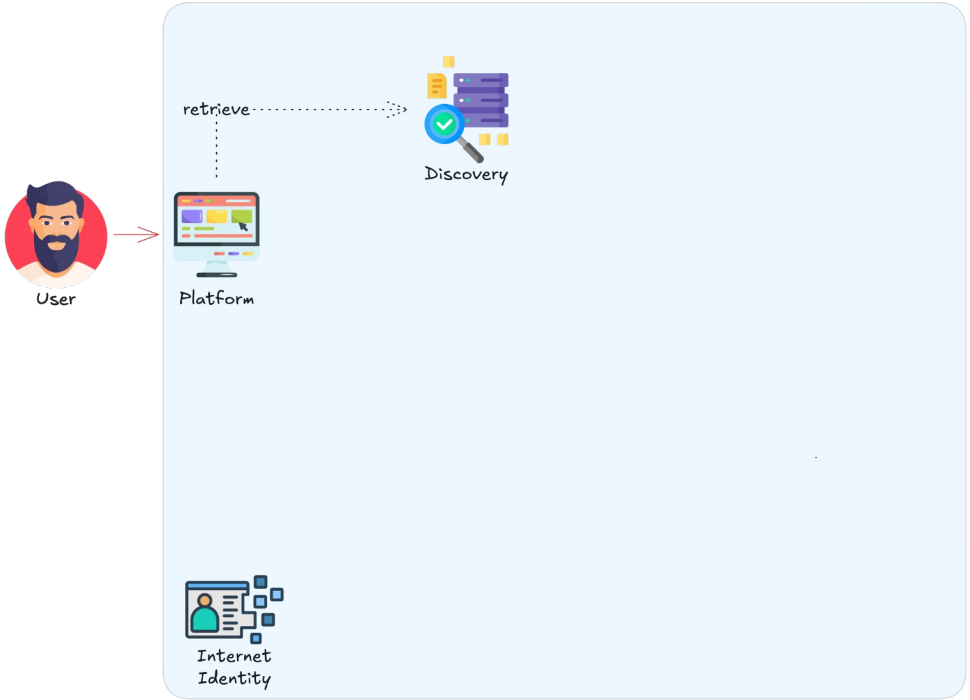

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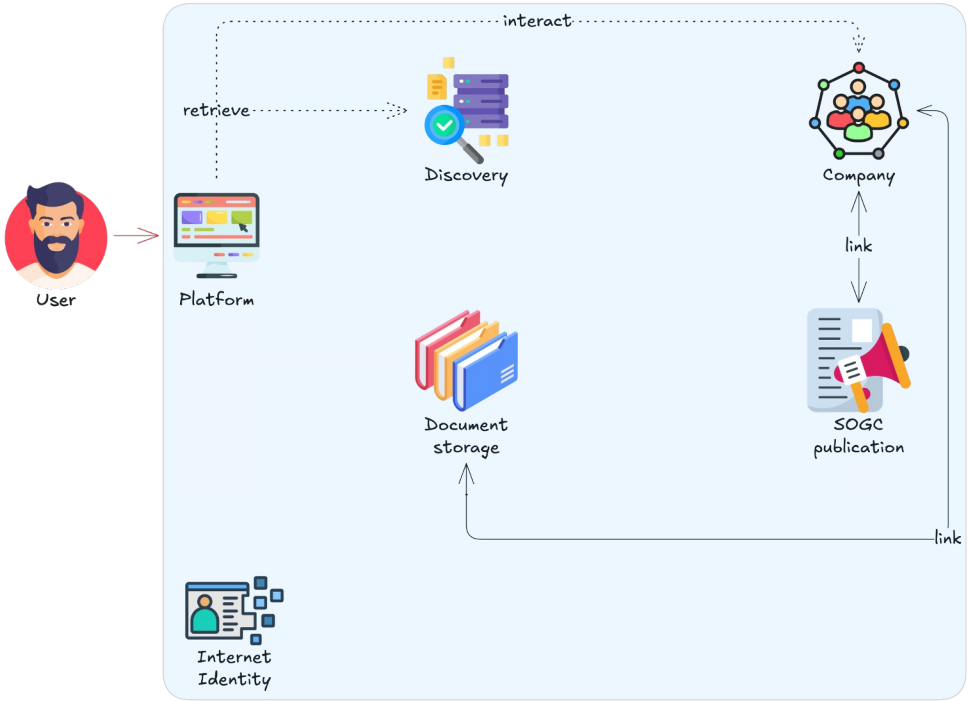

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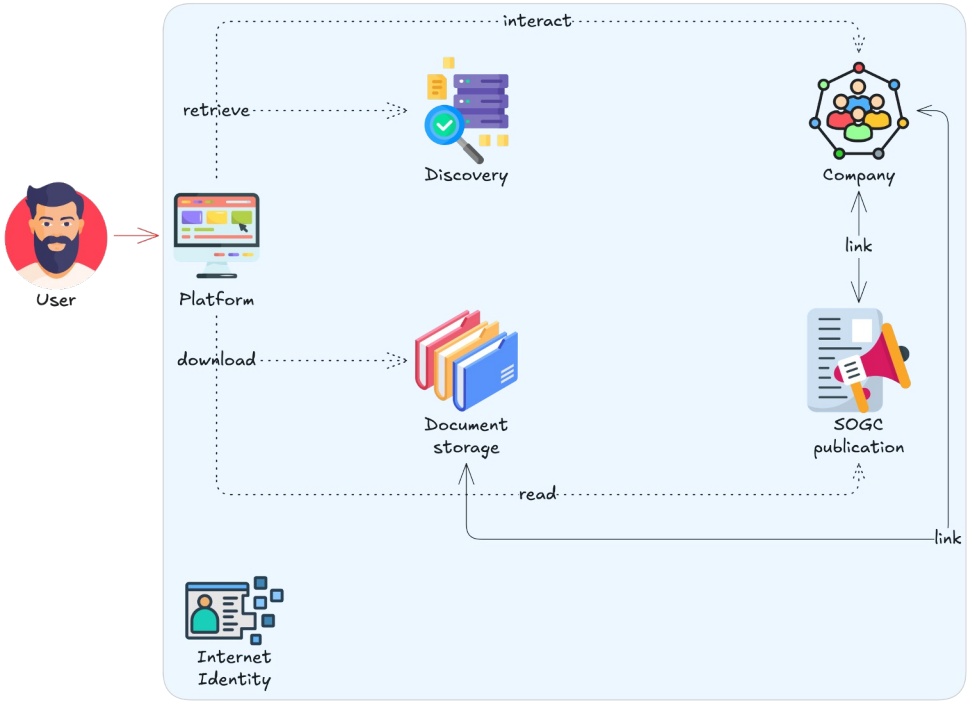
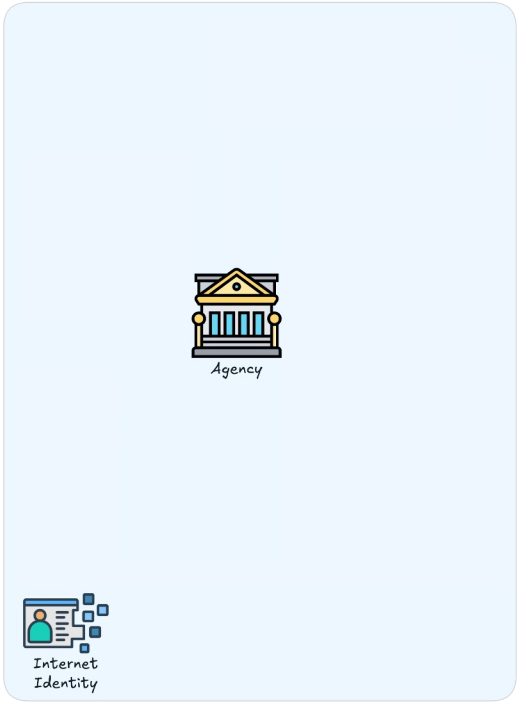


Workflow - Change legal form



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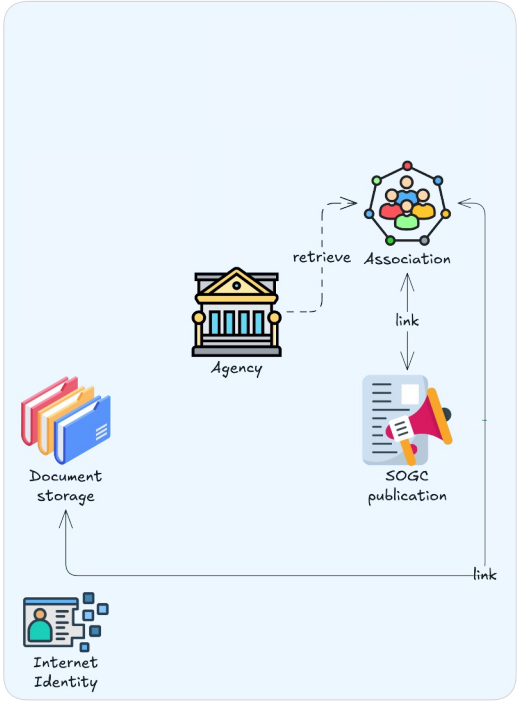

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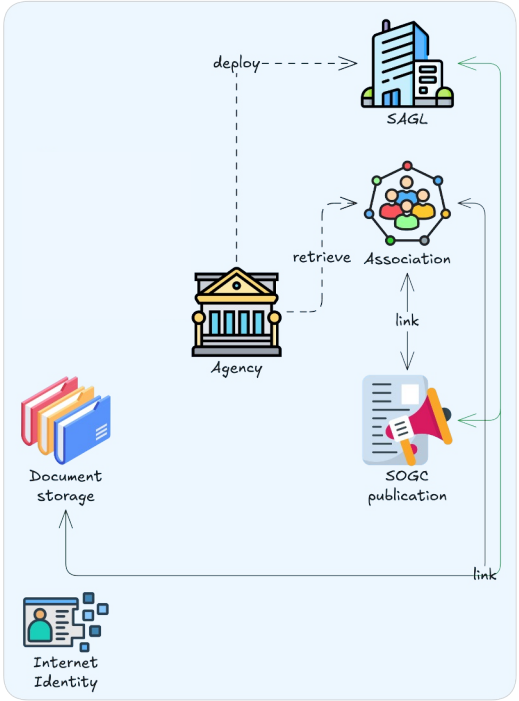

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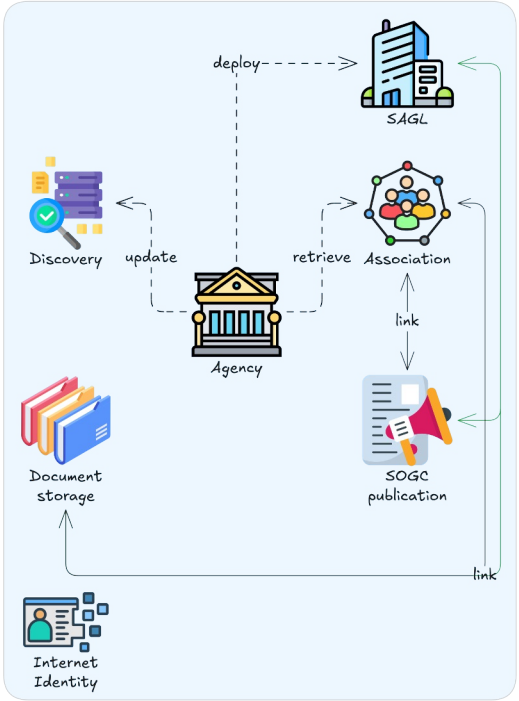
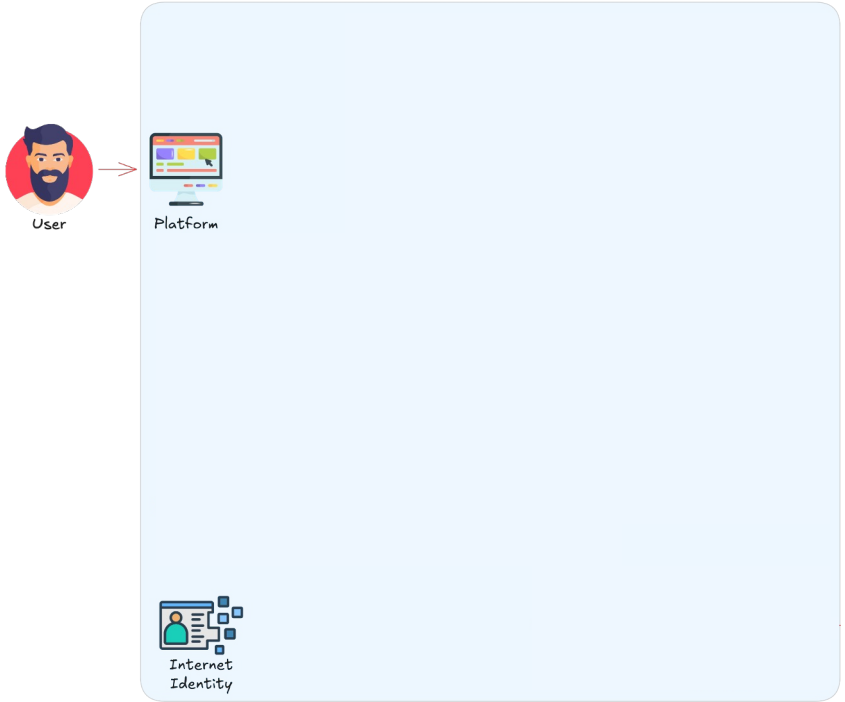


Workflow - Voting



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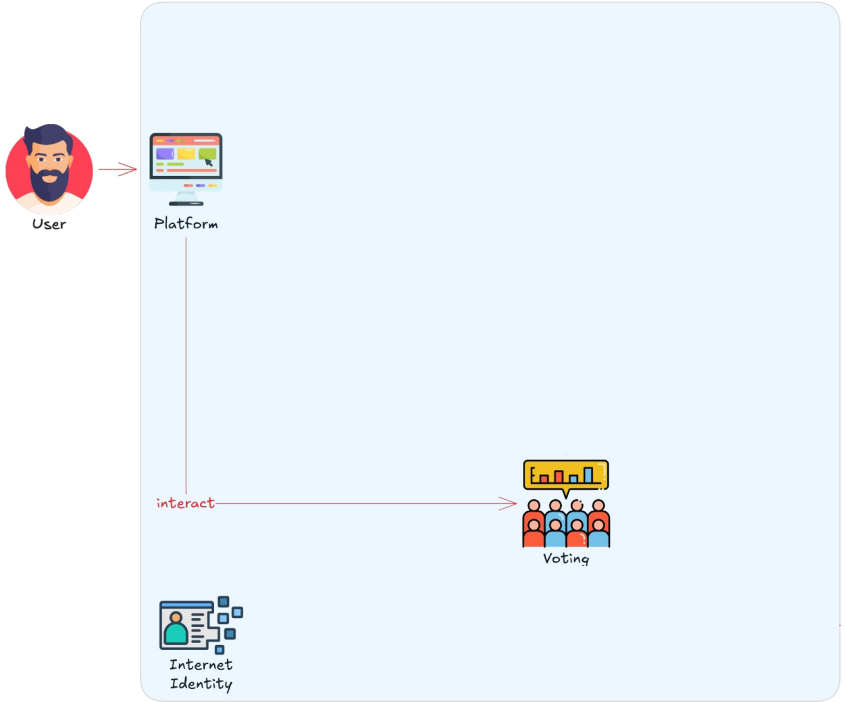

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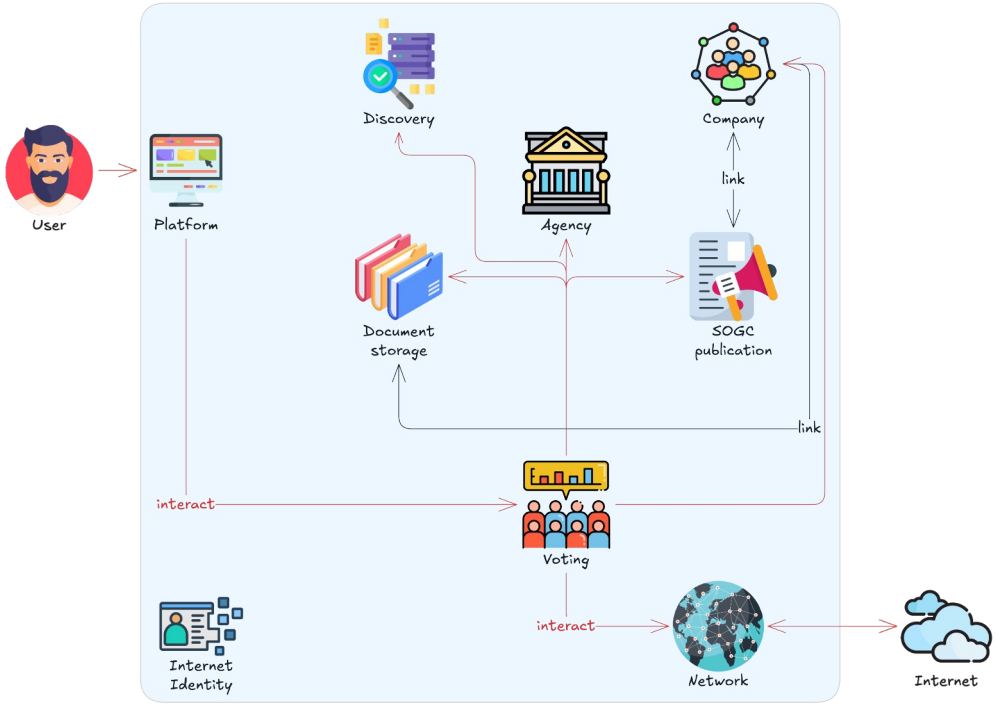


Canister controller management

- Complete operational authority
- Critical for decentralization
- Real world:
  - Governmental entity
  - Distributed across department
- Technical:
  - MultiSig controller
  - DAO

Demo

Results

- Proof of Concept
- Public deployed and testable
- Legally compliant association
- Automation of governance
- Voting system
  - Create
  - Configure action
  - Manage
  - Execute action
  - Validate result

Limitations

- Partial automation due to legal constraints
- No tamper-proof documents
- Data privacy concerns
- Support only Association
- Market readiness gap

Roadmap - Technical

- Tamper proof documents
- VetKeys for data privacy
- Verifiable Credentials with Internet Identity
- From PoC to market

Roadmap - Legal validation

- TBTA real world testing
- Lugano municipality validation
- Government bodies integration

Impact

- Growth of DAOs
- Increase innovative perspective of Lugano
- Simplified company management
- Automated governance
- Rewards at any stage

Can DAOs be legal, decentralized, and usable?

Thanks!

Any questions or ideas?

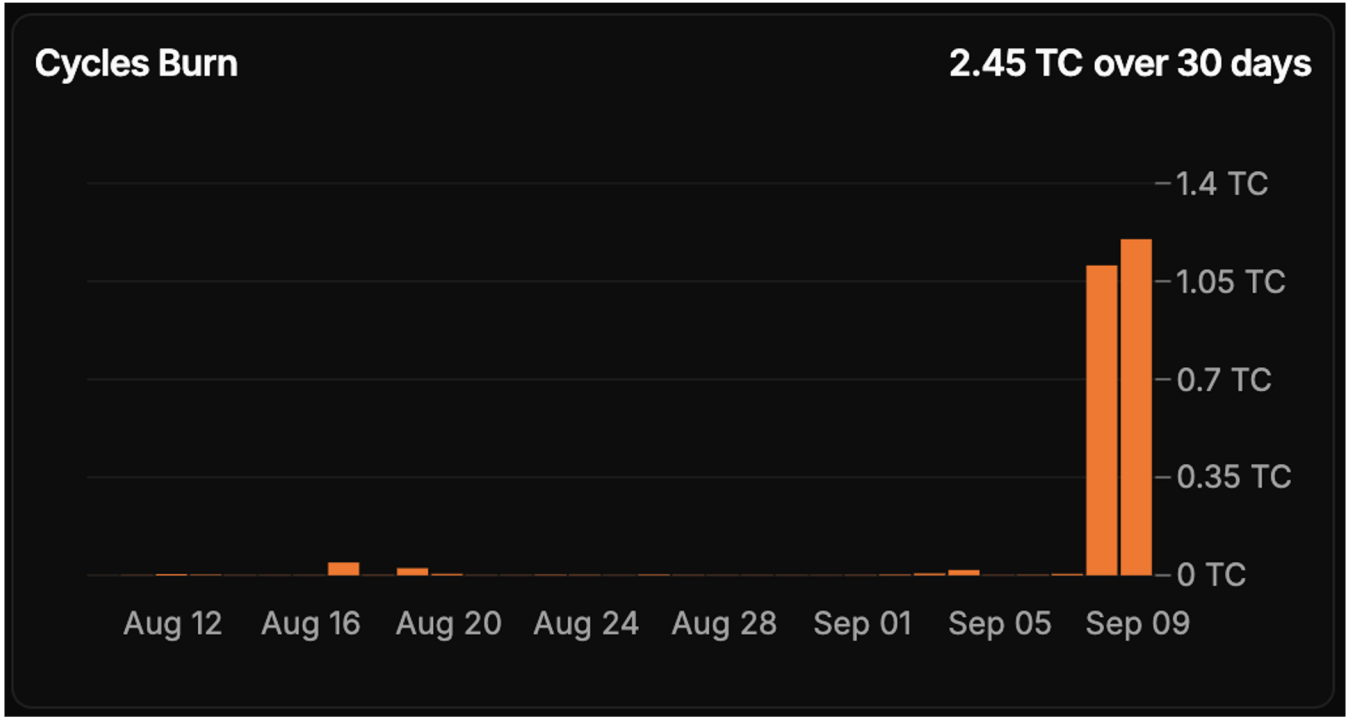
You can find me at

- LinkedIn: Lorenzo Ronzani
- GitHub: lorenzoronzani

ICP - Costs

- Cycles <–> ICP token
- 1 TC = 0.29 ICP (1.61 $)
- One time:
  - Deploy canister (0.5 TC)
  - Update code
- Recurrent:
  - Storage
  - Computation
  - Outside canister interactions

Architecture costs



ICP - Consensus

- Ethereum:
  - Blocks contain transactions
  - Permanent blocks
  - Full history
- ICP:
  - Deterministic change (from state A to state B)
  - Blocks contain messages
  - Nodes reach consensus on messages order
  - Trims old blocks

Existing solutions

	Aragon	Tally	Juicebox
Scope	DAO frameworks and governance	On-chain voting	Project funding and token issuance
Strengths	Legal grounding on Swiss association	Transparent voting and delegation	Flexible token models
Limits	Limited flexibility and integration	DAO operations automation	Lacks governance and legal coverage

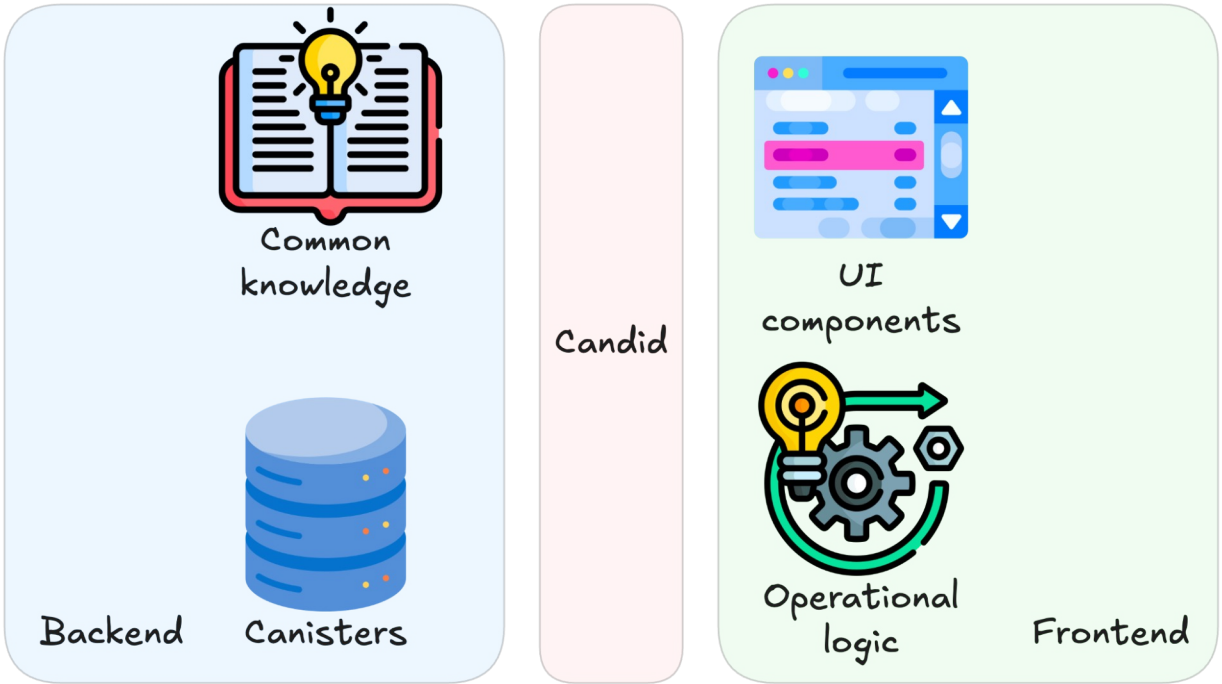
Common limits

- Ethereum
- Performances (13s to 5mins)
- User experience
- Interoperability
- Full-stack decentralization

Technological stack

- ICP
- Backend
  - Rust
- Frontend
  - Typescript
  - React
  - Shadcn

Codebase architecture



Test

- Backend
- Unit tests
- Integration tests