Digital Badges Framework

Theme: Talent and Skills Recognition

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Problem Statement

- **Work Data is locked in silos**
  - Multiple data providers
- **Repeated and inconsistent interpretations of data**
  - Multiple & proprietary data structures and schemas
- **Lack of Data ownership**
  - Users lack control of their data
- **Data is not dynamic**
  - Its not easy to showcase evolving qualifications

Solution

- **Digital Badges Framework**
  - Support Digital Badges
  - Blockchain Based
  - Conform to Self-Sovereign Identity Principles

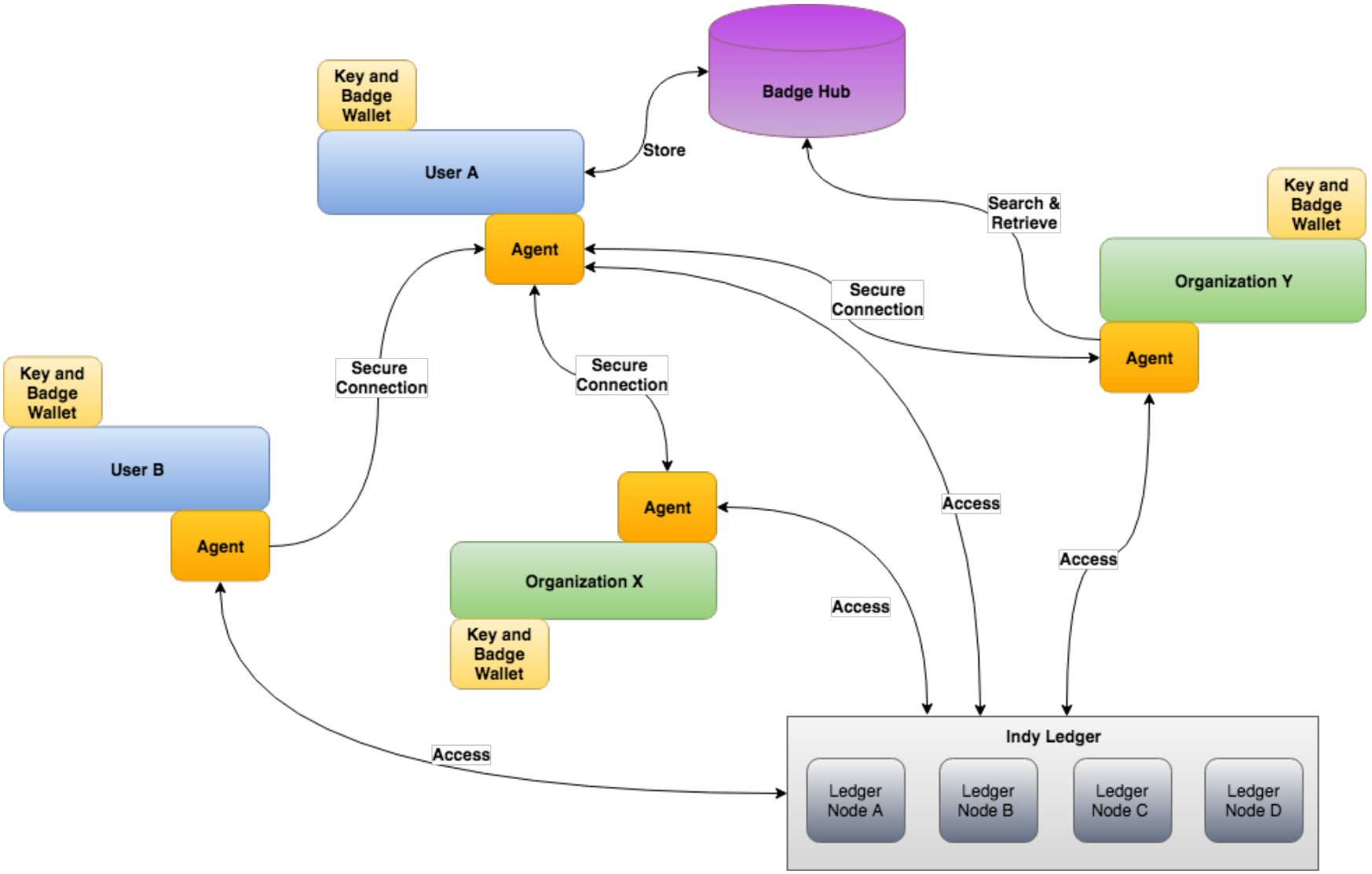
Digital Badges

- **Digital Badges**
  - Certificates, accomplishments, qualifications, skills or memberships
- **Based on Verifiable Claims**
- **Conform to pre-specified schemas**

Blockchain of Choice

Hyperledger Indy

Built for identity management use-cases


Badge Hub
Key and Badge Wallet
User A
Store
Search & Retrieve
Key and Badge Wallet
Organization Y
Agent
Secure Connection
Agent
Secure Connection
Secure Connection
Key and Badge Wallet
User B
Agent
Agent
Access
Access
Organization X
Access
Key and Badge Wallet
Access
Indy Ledger
Ledger Node A
Ledger Node B
Ledger Node C
Ledger Node D

Architecture components

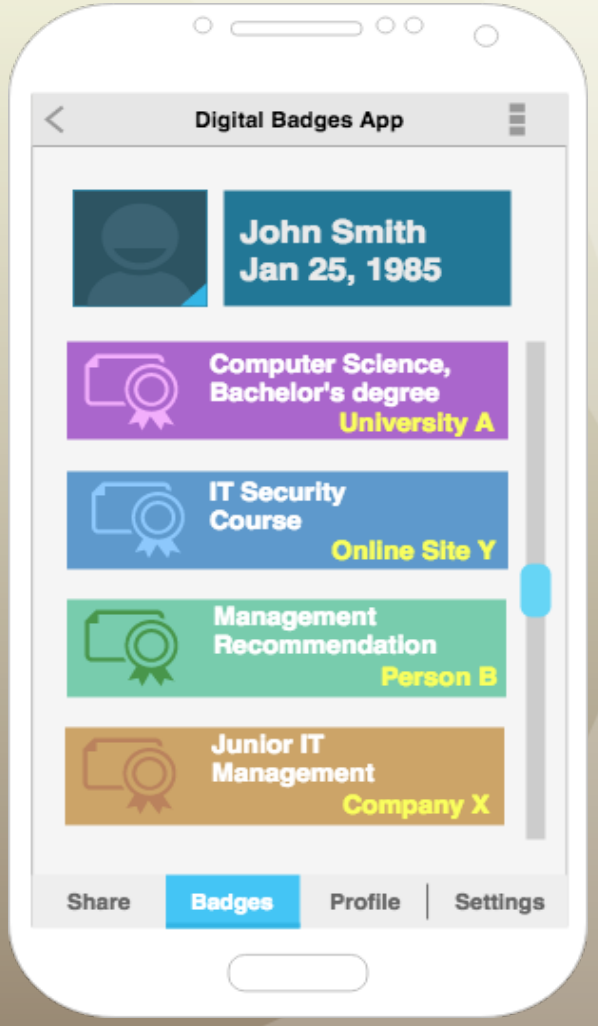
- **Badge Holders**
- **Badge Issuers**
- **Badge Verifiers**
- **Badge Hubs**
- **DLT**
- **Wallets**
- **Agents**

Badge Holder

- **Badge Holders are persons or organizations that hold one or more badges**
- **Each holder has a unique ID (Decentralized ID)**
  - **The DID is registered on the ledger**
- **Reliance on agents and wallets**

Self-Sovereign Identity

- Cryptographic Keys, Badges and Identity data are stored on user's digital wallet
- Badges can be published to Badge Hubs for easy search and retrieval by badge verifiers and other entities
- Sharing of badges are subject to usage policies set by badge issuer, and the badge holder



Badge Issuer

- **Each Issuer has a unique ID**
  - The issuer provides badge holders with digital badges
    - Support Multi signature Issuance of Badges
  - Relies on agents and wallets
- **A person can issue badges to another person**
  - The credibility of a badge depends on the credibility of the user issuing the badge

Role C: Badge Verifiers

- **Consume badges**
  - Obtain directly from badge holders
  - Search ledger for public badges and badge hubs end points
  - Query badge hubs for a particular badge
- **Reliance on agents and wallets**

Distributed Ledger Technology

- **Support ID Resolution**
  - Map ID to a JSON-LD document (DDO)
    - The document contains the crypto keys and link to service endpoints such as agents and badge hubs
- **Store Immutable Public Badges**
  - Company is ISO 27001 certified
  - User has an undergrad degree
- **Facilitates Privacy preserving Badge Revocation**
  - No interaction with the issuer for signature verification

Wallets

- **Store cryptographic keys**
- **Store digital badges**
- **Two flavours**
  - Mobile Wallets and Cloud Wallets
- **Supports key recovery mechanisms**
  - Shared Secrets
  - Biometrics
  - Key Vaults

Badge Hubs

- **Facilitate secure storage and indexing of badges**
- **Provide an Interface to query for digital badges**

Agents

- **Represent Entities**
- **Provide a public and permanent address**
- **Establish communication with other entities**
- **Autonomous**
  - **Can automatically reply to entities (i.e. recruiters) based on pre-defined or AI assisted rules**

Security and Privacy Concerns

- **No private digital badges are stored on the ledger**
- **Badges are stored on user's wallet or on badge hubs**
- **Badges are counter signed by user before being shared**
- **Usage policies and consents are optionally placed on the ledger for audit**
- **Minimum Disclosure: Utilization of Zero Knowledge Proofs**
- **Modular to support for Post-Quantum Cryptographic Algorithms**
- **Conform to Privacy by Design and GDPR terms**

Deployment and Operations

- **Public, Permissioned Blockchain**
- **Incentivization of Nodes**
- **Open System**
  - No vendor-lock ins, maximum interoperability
- **Data Structures and Schemas for Badges**
  - Support of Open Badges Schemas within Verifiable Claims

Digital Badges Framework

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