Interop-athon

September 9, 2021
8:00 am MDT - 12:00 pm MDT

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Overview

Cardea is now being commercially deployed to share COVID-19 test results, and vaccine and trusted traveler credentials.

To drive interoperability among these projects, Cardea hosted a four-hour virtual Interoperability “hack-a-thon style event” on September 9, 2021.

The maintainers of Cardea will stood up a test environment including an Issuer, Mobile, Mediator, Government, and Verifier Agents for participants to test against.

Goals

Drive interoperability! Interoperability is the key to decentralized identity's growth into a network of networks. This event tested Hyperledger Indy based projects; future interop-athons will cover other signature styles.

Participants had the opportunity to:

- Test different vendor solutions interoperating with the Cardea reference implementation
- Test vendor solutions interoperating directly with each other
- Test vendor solutions working with different networks
- Discover areas of friction
- Create a roadmap of changes to improve interoperability
- Publish test results

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By the numbers

- Received nine project submissions
- ~27 interop-athon participants
- Projects brought a variety of solutions to issue, verify, and hold verifiable credentials, using schemas provided by Cardea
- Different networks were also tested (the default network was Indicio TestNet)
- Each project had the opportunity to test against the Cardea reference implementation and against four other participants
- In total, 30 tests were conducted

Registered Participants

- IdRamp
- GlobaliD
- **Networks Synergy**
- Canadian Credential Network
- Enigma Club Dj's
- Silibrain
- **Liquid Avatar**
- **SITA**
- Ayanworks Technology Solutions Pvt. Ltd.

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BOLD= Demo Day Participant

Testing

- Indicio set up a reference implementation including:
  - Cardea Issuers
  - Cardea Mediator
  - Cardea Mobile wallet
  - Cardea Verifier
- Using Zoom breakout rooms, each participant had the opportunity to begin the day testing against the Cardea reference implementation
- Participants also had the chance to meet in pairs to test against one another, with an Indicio trained staff member to facilitate

Workflow

Health Credential Issuance

- Lab Enterprise Agent displays an invitation
- Holder Agent connects using the invitation
- Lab Enterprise Agent requests identity information using the present-proof v. 1 protocol
- Holder Agent responds with a self-attested identity proof
- (Optional) Lab Enterprise Agent issues a lab_order credential
- (Optional) Lab Enterprise Agent checks to make sure a connection (contact) has been issued a lab_order
- Lab Enterprise Agent issues a lab_result, vaccine, or vaccine_exemption credential to the Holder Agent

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Workflow

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Trusted Traveler Issuance

- Government Enterprise Agent displays an invitation
- Holder Agent connects using the invitation
- Government Enterprise Agent requests identity information using the present-proof v. 1 protocol
- Holder Agent responds with a self-attested identity proof
- Government Enterprise Agent requests presentation of a lab_result, vaccine, or vaccine_exemption credential
- Holder Agent responds with the credential of its choice
- Government Enterprise Agent verifies the credential cryptographically and validates the following attributes (if you are trying to demonstrate a particular use case, you can validate more): a. lab_result must be “Negative” and lab_specimen_collected_date must be a Unix timestamp less than 3 days ago OR lab_result must be “Positive” and lab_specimen_collected_date must be a Unix timestamp more than 28 days ago b. vaccine: vaccine_series_complete must be “true” and vaccine_administration_date must be a Unix timestamp more than 14 days ago c. vaccine_exemption: exemption_expiration_date must be a Unix timestamp in the future.
- Government Enterprise Agent issues a trusted_traveler credential to the Holder Agent

Workflow

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Trusted Traveler Verification

- Verifier Agent displays an invitation
- Holder Agent connects using the invitation
- Verifier Agent requests presentation of a trusted_traveler credential
- Holder Agent responds with its trusted_traveler
- Verifier Agent displays “Approved” or “Not Approved” depending on the result of the cryptographic verification (we recommend verifying trusted_traveler_expiration_date_time (Unix timestamp) is not in the past using a predicate proof).

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Success

- Teams that fully implemented the selected Cardea **schemas** had a high degree of interoperability
- Teams that prepared tools against existing standards using Cardea based agents were highly successful interoperating with other Cardea based agents
- Credential verifications worked especially well with other agents operating on the same **network**
- Teams that used the Aries **protocols** and the agreed-upon schemas were able to participate in the ecosystem
- Teams that participated were able to benefit from cross- community troubleshooting and problem solving, expedited resolutions

Lessons Learned

- Some participants used shortened URLs for interactions, an option that was not expected
  - As we try to interoperate in health credentials, we need to improve our use of shortened URLs
- Participants expected connectionless presentations
  - There were limitations making connections when agents used different connection protocols, specifically connectionless protocols, even though they use the same standards from Aries
  - In the future, we should broaden the feature set to include more agents
  - We had situations where agents were using different, valid protocols to accomplish the same task. Because the agents supported one or another, when they came to connect, they were expecting different things from the situation. There are two ways to connect using the Aries protocol. Both are fine, but both agents have to use the same one to be successful
  - Either pick one protocol and stick to it, or agents should be written to be flexible

Lessons Learned (cont'd)

- Ran into trouble when schemas and testing procedures were not followed
  - The procedures to follow must be transmitted to participants further in advance so that they can prepare
  - Pre-testing against reference implementations would help avoid this in the future
- Participants who varied from Hyperledger Aries protocols found challenges interoperating with other systems
  - It is important to test among other agents in the ecosystem to find unexpected errors
  - Sometimes it takes something written by a different team to expose things that vary from community standards or discover where the community makes a discovery and needs to come to a standard
- Cross-network testing identified compatibility challenges
  - Includes initial setup for participation with the event and dynamic switching

Recordings and Notes Repo

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Full event details and recordings are available

Recordings can be found here
Complete repository of testing notes can be found at the following links:

- Room 1
- Room 2
- Room 3
- Room 4
- Room 5

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Demo Day

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Code

- Cardea github https://github.com/thecardeaproject
- Agent URLs:
  - **Mobile Holder:** https://github.com/thecardeaproject/cardea-mobile-holder/releases/tag/1.1.0
  - **Health Issuer**: https://lab.cardea.indiciotech.io/
  - **Travel Issuer**: https://government.cardea.indiciotech.io/
    - Note: For the purposes of this test, a holder must send a message so the connection status is considered active. If the holder doesn't send demographics, the user must also edit the demographics before sending.
  - **Enterprise Verifier:** https://restaurant.cardea.indiciotech.io/
  - **Mobile Verifier:** https://github.com/thecardeaproject/cardea-mobile-verifier/releases/tag/1.0.2
- Cardea Schemas: https://github.com/thecardeaproject/cardea/tree/main/schemas