Extend secure DID Registry for Hyperledger frameworks on GitHub/GitLab

› Introduction
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  › Mentor(s): Mr. Vinod Panicker, Mr. Arun Prakash
  › Hyperledger Project: Hyperledger Aries, Ursa, Indy and Fabric.
Project Description: Develop the DID Registry Manager (DRman), a command line utility that can create a secure DID Registry on GitHub or GitLab. DID registry is a type of verifiable data registry that can be simply referred to as a role, a system performs to mediate the functionalities like create, verify, update, and deactivate the decentralized identifiers. The project aims to automate the process of creating a secure DID Registry on GitHub/GitLab, facilitating easy on-boarding of new organizations and enabling easy management.
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Project Objectives:

- Obj 1: Creation (of DID Registry): Function to **create** a DID Registry (**Verifiable Credential Registry**) for an organization on GitHub named **GVCR**. GitHub Organization can have multiple repositories, same is the case with DID Registries.

- Obj 2: Onboarding: Function to **add enable/restrict access** to members of an organization to a repository (GitHub repository users can be made members of an Organization, with different roles and privileges).

- Obj 3: Manage: Function to list **APIs** that are needed to add/update/revoke access DID’s or (DID Documents) saved as files on the repo.
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Project Deliverables:

› Deliverable 1: An architecture of GVCR in Verifiable Credential Model ecosystem.

› Deliverable 2: Design documents for the internal workflow of the GVCR.

› Deliverable 3: GVCR implementation: DRman command for creation/updating GitHub repository
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Project Execution & Accomplishments: Verifiable Credential Data Model

Credit to W3C, https://www.w3.org/TR/vc-data-model/
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 › **Project Execution & Accomplishments:** Using cryptographic open-source resources to realize the verifiable credential registry GVCR

- Issuer
  - Create Access Control Policy
  - Provide APIs to Issuer

- GVCR

- Distributed Ledger
  - Issue Credential
  - Acquires, Stores, Presents
  - Register Identifiers and Use Schemas
  - Verify Identifiers and Schemas

- Holder
  - Send Presentation

- Verifier
  - Requests, Verifies
Project Execution & Accomplishments: What are the problems that the GVCR can solve:

› An underlying system or network used to store/record DIDs.

› An underlying system support returning data necessary to produce DID documents.

› Utilizing existing cryptographic open-source data storage solution as trusted data storage, such as GitHub/GitLab.
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Project Execution & Accomplishments: Use cases diagrams for our DIDman,
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Project Execution & Accomplishments: GVCR workflows,
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Accomplishments

› Went through a learning roadmap of self sovereign identity (SSI) system. Decentralized Identifiers (DIDs) v1.0 → DID Specification Registries → Verifiable Credentials Data Model v1.1

› Deployment, integration, and testing on existing open-source Hyperledger projects: Hyperledger Aries, Hyperledger Ursa, Hyperledger Indy, Von-network and OrgBook by Bcgov.

› Architecture Design and system design of GVCR
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Next Step and Pending Activities

› Rest of the development

› API spec version 0.1 for GVCR

› Markdown tutorial documentation

› Swagger API documentation
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Project Output or Results:
- An example of structured path for trusted data storage, with committed DID document in the GVCR built by DRman.
Recommendations for future work (project scope):

- The main architecture, framework, and external/internal workflows of this project are worked out. The CLI command implementation developed by shell script needs to be extended.

- Extend the design to accommodate other Git providers, such as GitLab.

- Seeding as a Hyperledger project.

- Seeking the opportunities to be a project as part of the Hyperledger Labs.
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Recommendations for future work (personal scope):

› I’m planning to continue this project for improvement, documentation, and integration to other platforms (some potential opportunities, such as any blockchain ledger, a universal DID generator/resolver, other cryptographic libraries, etc.).

› Consider to enhance the features, do research to check whether the DID revocation function and decentralized key management system are feasible to be integrated into this project.

› I also noticed some research opportunities in this area, and hopefully, my mentors can continue advising me on this area.
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Insights Gained:

› Do your research first. Always check official documentations and use internet and community resource to find the answer.

› Never afraid to ask questions. Mentors and other people in the community are willing to help you.

› Get your hands dirty!

› Have fun to join the big family!
THANK YOU!