Design Effective OS to Manage Blockchain Networks

<table>
<thead>
<tr>
<th>Title</th>
<th>Design Effectively operational system to Customize and Manage Blockchain Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>PROJECT COMPLETED</td>
</tr>
<tr>
<td>Difficulty</td>
<td>MEDIUM</td>
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</tbody>
</table>

**Description**

Cello is aiming to resolve the following challenges, 1) Facilitate creation of blockchain network, can help user without blockchain background to setup their network quickly. 2) Security, need to implement mechanism to protect key pairs. 3) Cross organization communication, can connect blockchain networks among multiple organizations. This project targets to design and implement a practical operational system equipping with functionalities to solve above challenges, based on Hyperledger Cello code base.

**Additional Information**

- Project repo
- Available TODO features
- Governing module

**Learning Objectives**

- Work closely with community experts and developers to learn the open-source culture and skills
- Advanced knowledge inside the blockchain and distributed ledger areas
- Hand-on experience with web application design and implement

**Expected Outcome**

- Implemented new governing module to join blockchain networks together
- Advanced capabilities to manage blockchain networks, including life-cycle, chaincode, permission
- Other open objects that align with the existing roadmap

**Relation to Hyperledger**

Hyperledger Cello

**Education Level**

Graduate student preferred

**Skills**

- Interested with blockchain (Hyperledger Fabric) and distributed system
- Back end development skills including Python, Node.js. Experience with Django is a bonus
- Familiar with Cloud, Docker or Kubernetes is a bonus
- Front end skills including javascripts/css/html, experience with react is a bonus

**Future plans**

Contribution from this project will be merged to Cello's master branch, participant can keep contributing to the Cello community.

**Preferred Hours and Length of Internship**

Part-time (20 hours a week for 24 weeks starting in summer and ending in fall)
Mentor(s) Names and Contact Info

Baohua Yang, Haitao Yue, Tong Li, Jiahao Chen

Project Plan and Report

Project Presentation :-

Project Challenges to be Solved

1. Facilitate creation of blockchain network, can help user without blockchain background to setup their network quickly.
2. Security, need to implement mechanism to protect key pairs.
3. Cross organization communication, can connect blockchain networks among multiple organizations.

Project Deliverables

- API development
- Adding different agents for deployment of nodes
- Web Front-End Development for User Friendly Interface
- Unit Tests for maintaining code health
- Documentation for the APIs made and their metadata

Project Issues to be done

Phase 1

- Enhancement of Node API
- Implementation of `Peer node` API
- Creating operator for Kubernetes using operator-framework

Phase 2

- Implementation of other APIs
- Creating the Operator Controllers for CA
- Creating Operator Controllers for Peer and Orderer

Phase 3

- Handling the Certificates for the Peer and Orderer Nodes
- Refining of Custom Resource Specifications and Controllers
- Creation of Agent for Kubernetes Operator which handles the parts of frontend

Phase 4

- Deploying Agent images on Docker Hub
- Integration with the API / Dashboard
- Writing Specifications and User Documentation

Methodology

- Quarter basis review according to Hyperledger Internship Programme schedule
- Internal standup and updates:
  - Weekly meetings for planning on tasks and problem resolving
  - Using Hyperledger Chat for quick discussions

Mentee Name and Contact Info
• Manank Patni manankpatni@gmail.com