



COLLABORATION EARTH

Project-2

(Final Document)



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1. Problem Statement:

- Designing and implementing a cutting-edge, safe, and intuitive Web3 platform with blockchain-hosted smart contracts integrated for Collaboration Earth is the main challenge.
- This involves overcoming significant technical, environmental, and educational challenges, requiring a diverse set of skills in web development, blockchain technology, cyber security, and user education.
- The major problem is that the CO2 level is increasing and to reduce this we need to create a digital earth saver coin which helps to promote environmental sustainability and conservative efforts through a digital currency. The earth saver coin allows individuals to take part in the carbon offset market.
- The EarthSaver token aims to introduce this market by allowing individuals to have a considerable influence on the carbon market and support sustainable practices.

2. User Requirement

- Users can interact with Smart Contracts through the Webpages or Website.
- The UI should be user-friendly and easy to use.
- The system must manage transactions efficiently.
- The system must ensure the security and privacy of user data and transactions.
- The system should be scalable to handle an increasing number of transactions.
- The system should be reliable.

3. Software Methodology used in the project (Agile Methodology)

At the initial stage, we decided to adopt the waterfall method for the development phase. After 1 week of development, we realized this method was not going to be suitable as it was dependent on the previous stages. As a result, it was slowing down the development stage. Moreover, if one stage fails, the method does not allow the development stage to proceed further.

After discussion with the developers, we decided to adopt the Agile Methodology for the development phase. As Agile methodology allows us to decompose the project into smaller subtasks, no stage was dependent on the previous stage.

We divided the projects into 4 parts, they are:

- (1) Frontend Development (UI)
- (2) Smart Contract Development
- (3) Backend Development
- (4) API Configuration

The Agile methodology really helped us in dividing the project task effectively and the development stage went on smoothly. This methodology provided us with more flexibility.

4. Roles:

(i) Project Manager & Client Liaison:

Saikat Dutta Tanu is the project manager of this project. He coordinated with the team members and supervised the project development phase. He also documented the project (Project Proposal Documents, Final Deliverable Handover Presentation) with the help of the blockchain and back-end developer.

Saikat Dutta Tanu is the client liaison of this project team as well. Moreover, he is the contact link between the clients and the project team. He has organized client meetings; follow-up meetings and he is responsible for letting the clients know about the project status.

(ii) Blockchain Developer:

Bhargav Rangani has acted as the Blockchain developer in this project. Generation of smart contract and integration of blockchain network with the backend of the project was performed by him. He has also configured the API partially. He has also assisted the project manager with documentation of project plan, final deliverable handover presentation document.

(iii) Frontend developer:

Harshit Gajipara has developed the user interface of the project. He has designed and developed the front-end part of this project. He has partially developed the backend as well.

(iv) Backend and API:

Preetkumar Mulani has developed the backend of this project. He has configured the API as well. He also has helped with documentation along with the project manager. He has also assisted the blockchain developer in integrating the blockchain with the API.

(v) Tester:

Guangxin Sun is the tester of this project. He has performed all sorts of testing for this project and developed the test log.

(vi) Business Analyst:

Narinder Pal Kaur is the business analyst of this project. She has developed the Team Organization Document for this project. She has also analyzed the business aspect of this project.

No change was made in the project roles, and everyone performed up to the mark in their roles.

5. Scopes of the project:

The scopes of the project are mentioned below: -

- Smart Contract Generation
- Token generation
- Tokens withdraw
- Token deposit
- Token transfer
- EarthSaver Coin Generation
- Simple User Interface development
- Secure transactions
- Deployment of Smart Contract in Blockchain Network

No scope was changed. Only we are facing issues with token withdrawal scope because of the server. We are still trying to figure out the issues regarding this.

6. Changes in Programming Language:

Initially, Python was chosen as the primary source code for the project's development. Later, JavaScript was chosen, as we were provided with the liberty by the client to choose any programming language as per the developers' preference. Moreover, for the seamless transactions of the project phases, JavaScript was our first preference.

As a result, we used JavaScript (NodeJS) for the project's development.

We have used HTML and CSS for the front-end development of the crypto-wallet webpage.

7. Updated Requirements (Functional and Non-Functional Requirements)

Functional Requirements	Description	Non-Functional Requirements	Description
Initial Smart contract creation and implementation	Earthsaver tokens should be able to be created via the system based on predetermined criteria, like the total supply.	Security	Strong security measures must be put in place on the system to guard against fraud, manipulation, and unauthorized access.
Token Transfer	It should be possible for users to safely move Earthsaver tokens between blockchain addresses.	Scalability	Without compromising performance, the system should be scalable to handle an expanding user base and rising transaction volumes over time.
Token deposit	Users provide account information while depositing Earthsaver tokens. In addition to sending confirmations and doing validation	Reliability	For continuous availability, the system should have very few interruptions and downtime.

	checks, the system credits tokens.		
Tokens withdraw	Tokens for Earthsaver can be withdrawn by users, who can designate the quantity and destination. Tokens are deducted by the system upon confirmation, which also handles errors and provide acknowledgment.	Compliance	Regarding digital currencies and blockchain technology, the solution needs to adhere to industry standards and pertinent regulatory regulations.
Smart Contract Interactions	Token transfers and minting should be possible through user interaction with the smart contracts controlling Earthsaver tokens.	User Experience	Interacting with the digital money should have an intuitive, user-friendly interface that is compatible with a variety of platforms and devices.
Access Control	Only authorized parties should be able to access sensitive smart contract functions like token minting.	Performance	High performance should be demonstrated by the system, with quick transaction processing times and low latency.
Event Logging	For the sake of auditability and transparency, the system ought to record pertinent events and transactions on the blockchain.	Auditability	For the goal of accountability and regulatory compliance, the system should make it easier to audit and trace transactions and interactions

			between smart contracts.
EarthSaver Coin Generation	EarthSaver Coin needs be generated and named as 'ESV' and will be launched in Sepolia Network.	Compatibility	To ensure smooth integration and interoperability, the solution needs to work with the current blockchain infrastructure as well as well-known wallets and blockchain explorers.
Smart Contract Deployment in Blockchain Network	The smart contract should be deployed in the Sepolia Network for testing purposes.		

8. Testing

Testing was performed on the entire webpage and each module of the source code was tested. Initially, the testing displayed some warnings after the first development phase. Subsequently, when the source code was modified according to the clients' requirements, we took those warnings into consideration and all the bugs and warnings were fixed.

Test log document will be attached separately.

Screenshot of Test Log

i. First Stage Test Log

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Resource Allocation:

Ensuring proper distribution of resources, such as time, budget, and staff, helps in minimizing bottlenecks and team overload.

Risk Management:

Identifying potential risks early and devising mitigation solutions are one of the most key factors. Regularly examining and updating the risk management plan is necessary for successful completion of the project.

Stakeholder Engagement:

Maintaining consistent communication with stakeholders to manage expectations and incorporate comments throughout the project's lifecycle is a crucial factor.

Documentation:

Maintaining thorough documentation of all project aspects, including code, methods, choices, and lessons learned, is essential to aid knowledge transfer and future initiatives.

Quality Assurance:

Integrating quality assurance procedures early in the development process is helpful to quickly detect and resolve issues, resulting in a high-quality final product.

Team Cohesion and Morale:

Creating a positive team environment by recognizing accomplishments, immediately resolving problems, and guaranteeing teammates a best work-life balance, upholds the morality of the team members.

10. Engagement of Clients

- After receiving the information on how to contact the client and how to approach the respected client, we wasted no time in being in touch with the client.
- The first meeting with the client was held on 26th March 2024, and we politely asked about the client's overview of the project. The clients discussed the project thoroughly.
- We arranged 3 follow-up meetings after that for the development of the “Project Proposal Document”. We had several doubts and through these follow-up meetings, the doubts were

clarified by the clients. We are grateful to the clients for clearing up all the doubts and then with all the information provided by the clients, we started the development phase.

- After the development phase, we were facing some problems about ETH coins, and we approached the client through the final follow-up meeting, and the problem was resolved by the client. The project manager was constantly in touch with the clients via email in outlook.
- The contact between the clients and the client member helped us complete the project.
- The final deliverable presentation took place on 24th May 2024 with the course convener and clients. On this occasion, the meeting was held in MS Teams. The clients instructed us to hold a Zoom Meeting on 28th May 2024.
- On 28th May 2024, the Zoom meeting was held, and we presented our project work again along with demonstration. After the presentation, the client instructed us to make some changes to the project. We asked for 7 days extension.
- Finally, on 5th June 2024, we presented the updated project work to the client and the client was happy to sign off after testing the project work in their system on 6th June 2024 meeting.

11. Conclusion

The EarthSaver coin has been developed as a digital currency to support environmental sustainability and conservation initiatives. The goal of Earth Saver Coin is to encourage and compensate people and organizations for taking part in environmental preservation and protection initiatives. Earth Saver Coin can offer a transparent and safe platform to fund environmentally good projects like planting trees, cleaning up the seas, conserving wildlife, and renewable energy projects by utilizing blockchain technology. This virtual currency can be used to support environmentally friendly practices globally, crowdfund environmental projects, and increase public awareness of climate change. Earth Saver Coin is a tool that promotes good environmental effects and unites people all over the world in joint efforts to preserve the environment.