School of Information and Communication

Technology Griffith University

7821ICT– WIL (Work Integrated Learning) Single Project

Collaboration Earth Web3 and Blockchain Technologies

Project Proposal

7821_ICT_GC_Collaboration Earth 2 (Earth Saver Creation)

Date of Submission: 03 April 2024(Trimester 1)

Industry Partner: Collaboration Earth

Client: Phillip Sheriden

Team members:

Team Member 1: Saikat Dutta Tanu

Team Member 2: Bhargav Rangani

Team Member 3: Guangxin Sun

Team Member 4: Harshit Gajipara

Team Member 5: Preetkumar Mulani

Team Member 6: Narinder Pal Kaur

Revision History

Date	Version	Author(s)	Comments
14-Mar-2024	0.1		Added Overviews
14-Mar-2024	0.2		Added Key Factors
14-Mar-2024	0.2		Added Requirements
14-Mar-2024	0.2		Added Other Factors Draft Considerations
22-Mar-2024	0.3		Project plan – task breakdown
22-Mar-2024	0.4		Added Project Vision – Key Features and Technology. Draft started.
23-Mar-2024	0.4		Added draft for customer and benefits, draft table for success criteria
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24-Mar-2024	0.6		Added various terms and definitions to terms and definitions section.
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26-Mar-2024	0.8		Updated the Customer and Benefits
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27-Mar-2024	1.0		Document Cleanup and fixes
02- Apr-2024	1.1		Modified user story
02-Apr-2024	1.2		Final Version

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1. INTRODUCTION

The Collaboration Earth Web3 and Blockchain Technologies project seeks to create and deploy digital smart contracts as well as Web3-enabled web pages for users of the Collaboration Earth website. The project requires web development abilities as well as the application of blockchain technology, which will help address the global climate catastrophe by allowing individuals to actively engage in the carbon offset market. Collaboration Earth has contacted us about integrating Web3 Technologies, like as blockchain wallets and smart contracts, onto their website. The website and the respective database are already in existence, we will have to modify the API, database, and UI according to the requirements provided by the clients to us. This will enable its users to safely deploy new contracts as well as see any relevant existing contracts for which they have permission. The project's blockchain crypto wallet will be MetaMask, which runs on the Ethereum crypto blockchain. The purpose of this project is to

construct a working smart contract system, as well as to improve the website to provide a more current experience in line with emerging modern technologies such as Web3, cryptocurrency, and other blockchain systems.

1.1. Project Overview

The "Collaboration Earth Web3 and Blockchain Technologies" project aims to integrate digital smart contracts and web3 technologies into the Collaboration Earth website. Users of the website will be able to interact with blockchain-hosted digital smart contracts. This integration will make it easy to purchase carbon offsets while also encouraging environmentally beneficial behaviour. To accommodate these modifications, the project will also include upgrading the database. Utilizing modern technology, our goal at EarthSaver Creation is to address the pressing global issue of climate change.

We are working on developing a platform that will enable people to actively engage in carbon offset programs by using the ground-breaking Earthsaver digital token. To ensure transparency, immutability, and confidence in every transaction, we will first build digital smart contracts using blockchain technology. These agreements will secure and automate transactions pertaining to projects and purchases of carbon offsets. We plan to design user-friendly web interfaces for the Collaboration Earth website so that the platform is accessible to anyone. These user interfaces will provide a smooth way to investigate carbon offset options and buy Earthsaver tokens.
To facilitate user interactions and the operation of digital smart contracts, we will improve our database architecture while maintaining data integrity. Since reliability and vulnerability resolution are our top priorities, we will carry out thorough testing. We will compile an extensive cybersecurity report to protect user information and transaction integrity. Our mission is to enable everyone to participate in environmental projects and have a real impact on the battle against climate change. By creating EarthSaver Creation, we are doing more than just creating a platform; we are spearheading a movement that will make everyone's future more sustainable.

Client	**Information**
Client:	Collaboration Earth (Philip Sheridan)
Phone:	0477 134 571
Address:	5 Maygrove Crt, Runcorn QLD
Email:	phillip.sheridan@griffith.edu.au
Website:	https://www.collaborationearth.org

1.2 Team Overview

We are six students, who are from Griffith University's School of Information and Communication Technology working together to complete this project. Each person brings unique skills and knowledge to the project:

Project Manager and Client Liaison: Saikat Dutta Tanu serves as the project manager and customer liaison for this project. The project manager and client liaison are at the top of the

hierarchy, overseeing the entire project. He oversees overall project communication, coordination with the client, and ensuring that all project requirements are satisfied with milestones. He oversees overseeing the planning, execution, and delegation of responsibilities related to the project's pursuits and goals.

Business Analyst: Business analyst for this project is **Narinder Pal Kaur**. She is responsible for gathering, validating, and documenting business requirements regarding this project. She will also identify and evaluate inefficiencies and recommend optimal business practices and system functionality and behaviour.

Software Developer: Preetkumar Mulani and **Harshit Gajipara** are the developers for this project. They oversee writing the code and developing the software product. Apart from coding, they are responsible for sending regular updates to the project manager. They will work closely with other team members.

Tester: Tester of this project is **Guangxin Sun**. His responsibility is to write down the test scenarios, perform the tests according to the scenario designed earlier and he is going to create bug reports and he will prepare the testing documents. He will assess the software product is free from defects, performs accurately or needs improvement.

Quality Manager: Bhargav Rangani is the quality manager of this project. He will evaluate the execution or processes and production of deliverables according to the defined software process. He will identify and document deviations in the use of standards and procedures and he is responsible to provide the feedback about results of the quality assurance tasks to take corrective actions.

1.3Definitions and Acronyms

Acronyms	*Definition*
HTML	*HTML, or Hypertext Markup Language, is the standard language for creating and designing web pages. It gives web documents structure by defining page elements with a system of tags and attributes.*
CSS	*CSS (Cascading Style Sheets) is a stylesheet language that describes the presentation of an HTML or XML document. CSS specifies how elements should be shown on screen, paper, during speech, or in other medium. It*

	enables developers to customise the layout, colours, fonts, and other visual elements of a web page.
JavaScript	*JavaScript is a high-level, interpreted programming language that is mostly used to create dynamic and interactive content for websites. It, like HTML and CSS, is an essential web-building technology. JavaScript enables developers to add behaviour, interactivity, and functionality to web sites, increasing their engagement and responsiveness to user activities.*
SQL	*SQL, or Structured Query Language, is a domain-specific programming language designed for maintaining and manipulating relational databases. It provides a standardised interface for interacting with databases, allowing users to do a variety of operations such as accessing data, changing records, entering new data, removing data, and specifying the database's structure.*
Smart Contract	*A smart contract is a self-executing contract that has the terms of the agreement explicitly encoded into lines of code and exists on a blockchain, allowing for trust less and decentralised transactions.*
Blockchain	*Blockchain is a decentralised, distributed ledger technology that securely, transparently, and immutably records transactions across several computers. It rose to popularity as the underpinning technology for cryptocurrencies such as Bitcoin, but its applications go far beyond digital currencies.*
Ethereum	*Ethereum is a distributed blockchain platform that creates a network where application code, known as smart contracts, may be executed, and verified in a secure manner. Smart contracts allow participants to transact with each other without a trusted central authority. Transaction records are immutable, verifiable, and securely distributed across the network, giving participants full ownership and visibility into transaction data. Transactions are sent from*

	and received by user created Ethereum accounts. A sender must sign transactions and spend Ether, Ethereum's native cryptocurrency, as a cost of processing transactions on the network.
Black Box Testing	*Black box testing is the process of testing a system without prior knowledge of how it works internally. A tester offers an input and observes the output produced by the system being tested. This allows us to identify how the system responds to expected and unexpected user activities, as well as its reaction time, usability, and reliability issues.*
White Box Testing	*White box testing is a technique that allows testers to examine and verify the inner workings of a software system, including its code, infrastructure, and connections with other systems. White box testing is a critical component of automated build processes in a contemporary Continuous Integration/Continuous Delivery (CI/CD) development pipeline.*
SSL/TLS Certificate	*SSL/TLS (Secure Sockets Layer/Transport Layer Security) certificates are digital certificates that enable safe, encrypted communication between a web server and a web browser. They are used to establish a secure connection across the internet, ensuring that data communicated between the server and the browser is kept private and cannot be intercepted or altered by malicious third parties.*

UI (User Interface)	*UI, or User Interface, refers to the graphical layout of an application that allows users to interact with the software or system. It includes all items users view and interact with on their screens, including buttons, menus, forms, icons, photos, and other visual elements. The basic purpose of UI design is to develop an intuitive, visually appealing, and user-friendly interface that allows users to easily complete activities and traverse the application.*
Carbon credits	*Carbon credits are a critical component of carbon trading, a market-based method designed to reduce greenhouse gas emissions. The idea arose as a result of attempts to combat climate change and lower the overall carbon footprint of industries and activities.*

2. PROJECT VISION

2.1 Product Vision

Product name is Earth Saver Creation

For: Phillip Sheridan works with a project called Collaboration Earth, which is researching the use of emerging technologies such as blockchains and cryptocurrencies to provide new tools in the battle against climate change. Collaboration Earth's goal for this project is to explicitly prototype a system of modern technologies.

Who: Individuals looking to actively participate in the carbon offset market and The Collaboration Earth group is presently developing tools to assist businesses and organisations in implementing innovative technologies.

The: Collaboration Earth Website, which uses web3 technologies like as smart contracts and blockchains to help businesses operate in a secure and modern manner.

Is a: Web based platform with a complete account authorization system and a system for viewing, adding, and accepting smart contracts, as well as checking the status of a contract.

That: The website we are redesigning will empower users to battle climate change in a modernised manner. The combination of smart contracts and blockchain technology will allow members to build, deploy, and engage with contracts that reduce carbon emissions. Our solution will build on the existing collaborationerath.org webpage, providing further information about climate action in an interactive style.

Unlike: The existing website has a basic authorisation system but does not allow users to interact with contracts because it lacks a contract system.

Our product: Our product offers a user-friendly interface, smooth interaction with smart contracts, and real-time tracking of the carbon offset impact. Allows members (users) to pay for contracts and thereby contribute to the collaborative earth values. Our website also allows users to see existing contracts and create new contracts that other members can view, accept, or donate to.

2.1.1 CUSTOMERS AND BENEFITS

Introduction:

Our target clients are those who are worried about the climate catastrophe and want to make a difference. They are eco-conscious, technologically adept, and interested in sustainable methods. Our tool will help them by providing a simple platform for purchasing carbon offsets, tracking their impact, and encouraging businesses to minimise their carbon footprint.

This part will describe the project's key user groups and customers, the challenges they will encounter when using the programme, a solution to these problems, and how it will benefit them and others. For this project, we have identified two user groups: The beneficiaries are environmentally conscious groups of people who seek to cut global carbon emissions within their firm by implementing smart contracts. They could be from the official government branch or a local club. The other users, known as donors, use the website to donate and contribute to environmentally good contracts proposed by beneficiaries. The education and experience required for this are quite modest, but it does require a basic awareness of how carbon is produced and how it impacts the environment, as well as a comprehension of the carbon credit system used to interact with contracts. Now we will look at the client groups and the problems, solutions, and rewards they receive.

Problem:

From our first meeting with the clients, we have come to know that there is an existing website and database that we need to modify and develop the API respectively for securing the transfer of the Ethereum. We will have to ensure secure transactions of Ethereum. We will have to implement Blockchain and Web3.0 technology in this regard. There is already a page named Fundme, which has the potential to add smart contracts to the blockchain and fund these smart contracts while they are running. These smart contracts leverage Carbon credits, a currency available through the MetaMask wallet, to interact with the smart contracts while also providing benefits such as tax discounts. The issue is that we cannot ensure secure transactions and are unable to interact with the contract while it is active on the blockchain. When a contract is active, it is not ensured that the transaction is going to be secured and successful.

Solution:

We will use blockchain technology to generate EarthSaver tokens, take Input from Sequester. To protect the integrity of the carbon offset process, the contract must place a high priority on safeguarding the confidentiality of sensitive data and transactions, prohibiting unauthorized access of manipulation.

Our goal is to use blockchain technology to develop a digital currency called Earthsaver tokens, which will enable anyone to take action against climate change. Our goals in partnering with Collaboration Earth on this project are to empower consumers to take an active role in the carbon offset industry and encourage companies to lessen their carbon impact. Designing digital contracts and building the digital money itself are the two main parts of the project.

We will conduct both white and black box testing on the existing website and chalk out the problems. We will modify the existing website, database and set up the API to conduct secure transaction of the carbon offset Ethereum. Testing is a vital part for the project to be successful. Blockchain technology should be injected in proper manner for ensuring secure transactions.

EarthSavers' smart contract functions similarly to a unique program that is permanently stored on the blockchain. It has a set of coded rules all its own. Among its capabilities is the creation of a brand-new class of digital token known as EarthSavers. The smart contract makes a certain quantity of EarthSavers tokens when a user initiates the creation process. Like digital currency, these tokens have many uses within the blockchain system.

Like a digital wallet, the smart contract also generates a secure location for the EarthSavers tokens to be stored once they are created. The smart contract itself contains this wallet. The freshly created EarthSavers tokens are then transferred into this wallet by the smart contract. Within the code of the smart contract, everything occurs automatically and is stored on the

blockchain. Thus, consumers may feel secure knowing that their EarthSavers tokens are handled and kept safe in accordance with the guidelines established by the smart contract. In the section 3.1 both functional and non-functional requirements are discussed.

Creating Digital Contracts:

Designing and coding smart contracts with an appropriate blockchain platform, such as Ethereum, is the first step in creating digital contracts. The regulations governing Earthsaver tokens will be outlined in these contracts, along with details about their distribution strategy, minting and transfer capabilities, and overall supply. By using rigorous evaluation and auditing procedures and according to best practices to protect user assets and uphold system integrity, we will guarantee the security and dependability of these contracts.

Developing Digital Currency:

To create a digital currency, a token smart contract must be written and implemented on the selected blockchain network. Earthsaver tokens will behave according to this contract, enabling blockchain transactions between users and the tokens. When the system is up and running, users can earn Earthsaver tokens by buying carbon offsets or by taking part in other contract-specific beneficial activities. To safeguard the virtual currency and guarantee adherence to pertinent laws, security protocols will be put in place.

Website and Database Modification:

We will improve the current websites and databases to include the changes required for a smooth connection with Web3.0 and blockchain technology. This entails creating APIs to enable safe Ethereum transfers and guaranteeing smart contract compatibility. Blockchain and Web3.0 Technology Implementation:

We aim to improve transaction security, transparency, and efficiency through the integration of Web3.0 and blockchain technologies. The blockchain will be used to implement smart contracts, which will enable safe communication and the management of carbon offset projects.

Improvement of the Fundme Page and Smart Contracts:

To facilitate the development and financing of smart contracts on the blockchain, we will enhance the Fundme page. To enable transactions and offer advantages like tax breaks, these smart contracts will make use of Carbon credits, which are available via the MetaMask wallet.

Assuring Secure Transactions and Active Contract Interaction:

The security of transactions will be given priority in our system, with encryption and protection against unwanted access being provided for Ethereum transfers. Furthermore, to guarantee dependability and transparency, we will put in place how users can communicate with live contracts on the blockchain.

Benefits:

The advantages of improving this existing webpage are:

- Improved control over contract deployment, viewing of active contracts, and interaction with live contracts.
- Allowing for improved management of adding funds to existing contracts and refunding if the target is not met by the specified date.
- Allows for easier access to the webpage when exploring.
- Ensure secure transactions.

1. **Simplified Carbon Offsets**: With our user-friendly platform, which is supported by blockchain transparency, clients can effortlessly acquire carbon offsets and monitor their impact.
2. **Promotion of Sustainability**: Companies are encouraged to align with eco-conscious principles by lowering their carbon footprints through rewards like tax breaks.
3. **Enhanced Knowledge**: By providing clients with informational materials on carbon emissions and offsets, environmental awareness is raised.
4. **Community Engagement**: Clients can actively take part in environmental projects, which promotes a sense of shared responsibility among contributors and beneficiaries.

2.1.2 KEY FACTORS TO JUDGE QUALITY

There are some key factors to judge quality of our product which are given below:

I. **Performance**: Responsive and seamless user experience.
II. **Quality**: Accurate tracking and reporting of carbon offset impact
III. **Financial**: Affordable pricing for carbon offset

IV. **Competitive Differentiation**: Unique features and value proposition compared to other carbon offset platforms

V. **User Acceptance**: Intuitive and user- friendly interface. The website provides simple instructions and workflows for users to connect to their blockchain wallets, as well as an intuitive user interface for exploring existing smart contracts and deploying their own smart contracts. The website must be easy to use across numerous devices, including tablets, PCs, and smartphones. The webpage must be usable on all common devices, including smartphones, tablets, and computers, include a user-friendly navigation interface for smart contracts, allow users to connect with blockchain technology like
smart wallets and add a mean to deploy smart contracts.

VI. **Reliability**: Blockchain Systems' code and connections should be extremely stable, with high uptime and few faults to ensure no disruptions during normal operation. The webpage must: - have 99% uptime on blockchain connectivity. Errors will not be displayed when examining available smart contracts. Accept a smart contract without displaying any issues. Errors are not displayed when installing a smart contract. Error messages should not be displayed when signing in and out of the website.

VII. **Future Proofing and Installation**: The project's code must adhere to modern standards, with plugins/modules and other components that are expected to be long-lasting and reliable. The code must be carefully commented on and documented so that future changes have fewer problems updating. The project must contain: All code should be commented on. Each module must include documentation. Third-party modules/packages must be pinned to either the working version or a long-term stable branch.

2.1.3 KEY FEATURES AND TECHNOLOGY

Key feature of the product given below:

User registration and authentication

Real-time tracking of carbon offset impact

Carbon offset marketplace

Integration with smart contracts for secure transactions

Business engagement and influence tools

Key Technologies Overview:

We will implement Blockchain technology in this project. Blockchain, and notably Smart Contracts, are the major technologies that will be used in the project. The project's main goal is to build a web 3.0 website that allows users to create and interact with Smart Contracts. These Smart Contracts aim to incentivize CO2 giants to reduce emissions by compensating them with currency.

The technology stack for our product includes:

Blockchain technology for generating EarthSaver tokens and taking input from the sequester.

Front-end: HTML, CSS

Back-end: Node.js, Express.js/ Python.

Database: MySQL

Smart contracts: Solidity, Ethereum Blockchain

For the frontend development we will implement Web3.0 technology which is an integration of HTML, JavaScript, and CSS. For back-end we will either choose Node.js and Express.js or Python, which will be decided on the convenience of the developers as we have been granted that freedom by the clients. Database will be modified through My SQL. API will also be modified.

Key Features:

This website allows users to post and participate with smart contracts, with a particular emphasis on environmentally conscious agreements. Here are the major features and components that the website will offer:

EarthSaver Token Generation: This project's main aim is to generate Earthsaver tokens which will be generated by using Blockchain Technology.

Smart Contract Integration: The project's core feature is the use of self-executing contracts to incentivize CO2 reduction. The website will allow users to create and track their own smart contracts, as well as see and interact with contracts created by other members.

User Wallet Integration: Because smart contracts include blockchain currency transactions, the website will give access to individuals' crypto wallets. The wallet information will be linked to the user's account.

Decentralised Architecture: Because the website is a Web 3.0 application, it is decentralised. This component is critical to meeting the project's objectives. Control, decision-making, and data are spread throughout the blockchain. Transparency is essential for success when using websites.

It is critical to be aware of the potential ramifications that these qualities may carry. Some downsides of a Web 3.0 application, and more specifically this project, may include:

Complexity: Creating, deploying, and administering smart contracts necessitates specialised understanding of blockchain technology and programming. Because of the intricacy, there is a risk of errors during the development and maintenance cycles.

Technical Barriers: Blockchain technology has only recently gained recognition. Users will need to learn how to deal with smart contracts and use wallets, which may provide a technical challenge for some.

User Adoption: Encouraging firms to adopt recent technology and processes may encounter opposition owing to unfamiliarity. Conflict with current systems controlled by major entities is another factor to consider.

Scalability concerns may arise because of the blockchain's mining and node hosting requirements. This may result in slower transaction speeds and higher gas prices during busy hours.

Energy usage: Blockchains demand computationally expensive processes, which may raise concerns about energy usage, particularly for environmentally conscious organisations.

2.2 GENERATIVE AI

You must discuss with the client the acceptable use of generative AI for your project. In this section discuss the following related to the usage of Generative AI:

- *Are you allowed to use Generative AI? If yes, in which circumstances or for which aspects of the project are you allowed to use it?*

  In this project, we are allowed to use Generative AI under the following circumstances

    - Specify situations or aspects of the project where generative AI will be used
- *What are the privacy concerns/issues and IP concerns/issues that should be taken into consideration when using Generative AI?*
- Implementing appropriate security measures to protect sensitive information
- Obtaining necessary permissions and licenses for using AI- generated content
- Ensuring compliance with data privacy regulations
- *How will you ensure that your usage of Generative AI is responsible, ethical and takes the above into account?*

  We will ensure responsible and ethical usage of Generative AI by:

    - Conducting regular audits and reviews of AI-generated content
    - Implementing bias detection and mitigation techniques
    - Providing transparency to users about the use of AI-generated content

2.3 OTHER PRODUCT FACTORS

Factors that are not part of the primary functionality but must still be present. These may include:

- **Interaction with associated systems/products:** integration with existing Collaboration Earth website and databases
- **Potential for design growth or modification:** Scalable architecture to accommodate future enhancements
- **Physical environment it will be used in:** Web-based platform accessible from any device with internet connectivity
- **Distribution**: The final product will be hosted on the existing server under the collaborationearth.org name. Files relating to the website's function will be transferred from the development environment to the server, where they can be accessible by the public using the existing URL. The website is accessible through a range of web browser-enabled devices.
- **Patent infringement/protection**: Ensuring compliance with intellectual property rights and obtaining necessary licenses
- **Safety and liability**: Implementing security measures to protect user data and prevent unauthorised access
- **Quality and reliability**: Regular testing and quality assurance processes to ensure a stable and reliable product
- **Ergonomics**: User- centred design principles for an intuitive and seamless user experience
- **Users' abilities**: Accessibility features to accommodate users with different abilities
- **Sourcing and assembly:** Collaborating with trusted partners for sourcing and assembly of necessary components
- **Distribution**: Web-based distribution through the Collaboration Earth website
- **Documentation, training, servicing, and maintenance**: Providing comprehensive documentation, training materials and ongoing support for users
- **Unusual equipment or facilities needed**: Identify any specific equipment or facilities that may be required for the successful implementation of the solution

- **Service, Maintenance, and Modification:**
  Change and Version Control
  Git (GitHub) will be used to manage changes and versions for this project. Git enables automated version control of code throughout a project's development cycle. All development will take place on a private Git repository. During the final stages of development, this code will be cloned to the web server, and a zip of the repository will be generated and provided to the customer upon handover.
- **Code Standards:**
  All code for the project should be excellently written and follow the coding standards of the languages used. This includes the proper use of brackets, indentation, camelCase for variable, function, and class names, appropriate naming schemes, and segmented code. Block comments will be used to describe the purpose and functionality of newly formed functions and/or classes, while inline comments will be used to clarify ambiguous code.
- **Encryption**: Because the Collaboration Earth project involves the transfer of virtual cash, any data or sensitive information sent to and from the client or server must be encrypted using encryption methods. The Collaboration Earth domain will need to be secured with an SSL/TLS certificate to ensure that any information sent or received by the domain, or its users remains encrypted. This encryption is important to secure sensitive information being transferred. The blockchain platform has its own encryption and cryptographic algorithms. These approaches ensure that the information delivered is secure, private, and immutable.
- **Liability and IP:** Any content received from an external source and used on the site, including but not limited to photos, icons, video, or text, must adhere to the licencing applied by the content originator. This work must have a copyright permission that allows for commercial usage before it may be used on the Collaboration Earth website. To protect Collaboration Earth's intellectual property, content developed during the project should be covered by a copyright licence that prevents its use by entities other than Collaboration Earth. A Content Licence Policy will be shown in the footer of the webpage that has this licence.
  Furthermore, due to the nature of Work Integrated Learning, those involved in the current project and Griffith University wish to be granted an Intellectual Property licence that allows for use in research and teaching, with the student team receiving a licence for use in a project portfolio. The licence given does not allow for the exploitation of collaborative earths content or resources.

2.4 SUCCESS CRITERIA FOR CLIENT

The success criteria for the client are as follows:

- Seamless integration with the Collaboration Earth website
- Successful implementation of digital smart contract and Web3 enabled web pages
- Positive user feedback and adoption of the platform
- Increased carbon offset purchases and reduction in carbon footprint of businesses

- Timely delivery of all project milestones and deliverables
- High quality and reliable performance of the developed solution
- Delivery of comprehensive system documentation for future reference and maintenance

3.1 FUNCTIONAL & NON-FUNCTIONAL REQUIREMENTS

Functional & Non-Functional Requirements

Functional Requirements:	**Description**	**Non-Functional Requirements:**	**Description**
Initial 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 checks, the system credits tokens.	Reliability	For continuous availability, the system should have very few interruptions and downtime.

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.
		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.

3.2 User Stories

Requirement	User Story	Acceptance Criteria
Functional - Initial Contract Creation and Implementation	As a Developer, I want to create and implement the initial smart contract for Earthsaver tokens, so that users can participate in the carbon offset market.	As long as the smart contract's original development and execution are successful, it can be deployed on the blockchain and continue to function and be accessed by parties.
Non-Functional - Security	As a Developer, I want to implement robust security measures to protect against unauthorized access and fraudulent activities, so that users' assets and system integrity are safeguarded.	The system will detect an attempt at unlawful access and halt any undesirable activity as long as the security measures are in place.
Functional - Token Transfer	As a Member, I want to securely transfer Earthsaver tokens between addresses on the blockchain, so that I can engage in transactions related to carbon offset purchases.	When a member starts a token transfer to a different address, the tokens are successfully transferred and documented on the blockchain, provided that the token transfer feature is operational.
Non-Functional - Scalability	As a Developer, I want to ensure the solution is scalable to accommodate a growing user base and increasing transaction volumes over time, so that performance is maintained.	Because of the scalability of the solution, system performance doesn't deteriorate even when the number of users and transaction volume rise.

Functional - Smart Contract Interactions	As a Member, I want to interact with the smart contracts governing Earthsaver tokens to execute functions such as token transfer, so that I can manage my token holdings effectively.	When a member interacts with the smart contracts to transfer tokens, the transaction is successfully completed and documented on the blockchain as long as the contracts are accessible.
Non-Functional - User Experience	As a Developer, I want to provide an intuitive and user-friendly interface for interacting with the digital currency, so that users can easily understand and navigate the system.	Users can navigate and conduct actions easily with no usability concerns when interacting with the system because of its straightforward user interface.
Functional - Access Control	As a Developer, I want to restrict access to sensitive functions within the smart contracts to authorized parties, so that the integrity and security of the system are maintained.	Due to the implementation of access control, the system logs attempts made by unauthorized parties to access sensitive functions and refuses access in order to prevent further audits.
Non-Functional - Performance	As a Developer, I want to ensure the system exhibits high performance with fast transaction processing times, so that users can execute transactions quickly and efficiently.	Transactions that users initiate are processed quickly and with the least amount of latency possible since the system performance has been enhanced.
Functional - Event Logging	As a Developer, I want to log relevant events and transactions on the blockchain for transparency and auditability purposes, so that users can track and verify their interactions.	When users take actions inside the system and event logging is enabled, the events and transactions are stored on the blockchain and can be accessed for auditing reasons.
Non-Functional - Auditability	As a Developer, I want to facilitate auditing and traceability of transactions and smart contract interactions, so that users can have confidence in the	The implementation of auditability features allows auditors to track and confirm user and smart contract behaviors during system transactions and interactions.

	integrity and transparency of the system.	
Non-Functional - Compatibility	As a Developer, I want to ensure the solution is compatible with existing blockchain infrastructure and popular wallets, so that users can seamlessly integrate and interact with the digital currency.	Users can engage with the digital currency without experiencing compatibility problems even if they access the system through various platforms and wallets because compatibility has been guaranteed.

4 PROJECT PLAN

4.1 Task Breakdown: -

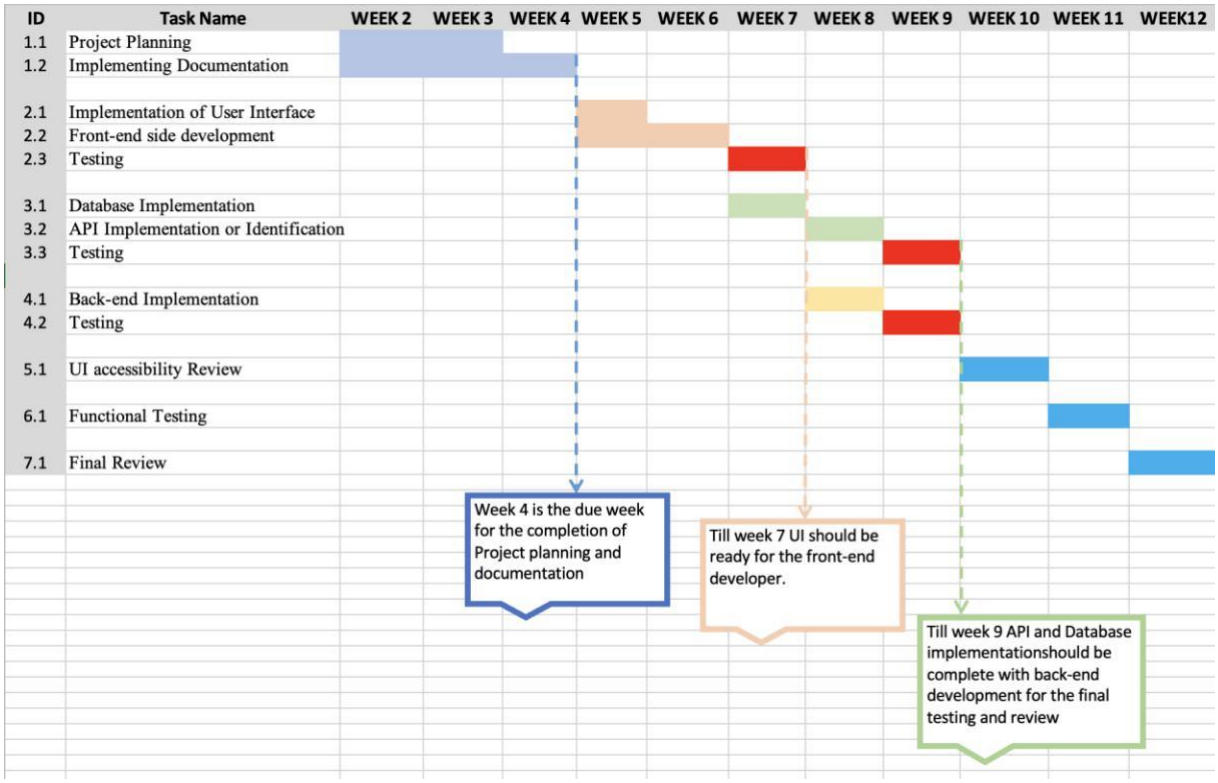
The table below shows the breakdown of each task for this project. It shows the title of the task along with its description, the estimated time to complete a particular task, the role required for a particular task and the due week of each task.

ID	Title	Estimated Time	Due Week of Task	Role Required	Description
1.1	Project Planning	1 Week	2	Project Manager, Business Analyst	In this point, we will do planning about what needs to be done first and what will be the following steps while making this project
1.2	Implementing Documentation	1 Week	3	Project Manager, Business Analyst	Creating a documentation will give us a clarification regarding functional and non-functional requirements.

2.1	Implementation of User Interface	1 Week	4	Front-end Developer	Implement the User Interface and design of the project.
2.2	Front-end side development	1 Week	4	Front-end Developer	Implement the user interaction with UI of the Project.
2.3	Testing	1 Week	5	Tester	Tester will test whether the UI interaction with the system is accurate and user-friendly or not.
3.1	Database Implementation	2 Week	6	Back-end Developer and Blockchain technologist	Back-end developer will create the database for the project.
3.2	API Implementation or Identification	1 Week	7	Back-end Developer and Blockchain technologist	
3.3	Testing	1 Week	7	Tester	Test the database and API have been correctly implemented or not.
4.1	Back-end Implementation	1 Week	8	Back-end Developer	Developer will link the database and API with the front-end side.
4.2	Testing	1 Week	9	Tester	Test whether front-end and back-end are working accurately together or not.
5.1	UI accessibility Review	1 Week	10	Quality Manager, Front-end developer	Test the User interaction and User interface of the project.
6.1	Functional Testing	1 Week	11	Quality Manager, Tester, Front-end and Back-end Developer	Test that each function is working properly and accurately in user-friendly manner.
7.1	Final Review	1 Week	12	Tester, Quality Manager,	Finally, test the entire system.

				Front-end and Back-end developer	

4.2 Gannt Chart: -



5. AGREEMENTS

All people identified in this document sign the form below to indicate that they have read the Project Vision and Agreement and agree to the contents therein.

X *Phillip E Sheridan*

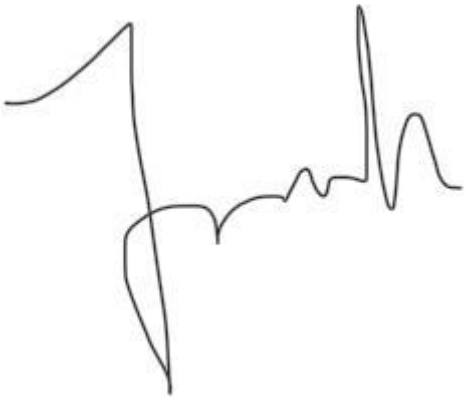
Client

X Saikat Dutta Tanu

Saikat Dutta Tanu

Bhargav Rangani

Guangxin Sun



Narinder pal Kaur

Preetkumar Mulani M. Preet

Harshit Gajipara