SCUBA CHAIN

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PROBLEM

To carry out today's scuba diving, the procedure usually works on paper and is laborious. The diver is responsible for carrying a physical card with him and diving centers spend a lot of effort and time on these approval and licensing processes. ScubaChain offers an innovative solution to solve this problem by incorporating not only digital services but also blockchain technology into the project.

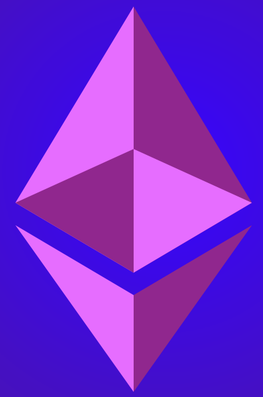
Analysis

ScubaChain leverages blockchain to ensure tamper-proof certifications and secure data management.

Enables diving instructors to verify certifications quickly and divers to manage their records securely.

Offers a modern, transformative solution for challenges in the diving industry.

Includes features like geolocation and weather integration to enhance user experience.



Solution

- Implements a blockchain-based platform to ensure secure and tamper-proof diving certifications and records.
- Simplifies certification verification processes for instructors and diving centers.
- Provides divers with a user-friendly system for managing their records securely.
- Integrates additional features like geolocation, weather updates, and dive event management for enhanced functionality.
- Increases efficiency, trust, and transparency within the diving industry.
- Drives digital transformation and addresses long-standing challenges in the sector.

Technologies Used

Mobile Application (Front-end)	Server (Back-end)	Blockchain and IPFS Integration
Flutter	Node.js (Express.js)	The Ethereum blockchain will be used to validate license data through smart contracts written in Solidity.
License validation, viewing blockchain hashes and IPFS connections features will be added.	PostgreSQL will be used to manage user and license data.	License documents will be stored on IPFS, which ensures decentralized storage by providing Access via Content Identifier (CID).
	RESTful APIs will handle communication between the front-end and back-end and will perform validation with PADI/CMAS databases.	

IPFS
(InterPlanetary File System)

Used for decentralized storage of certification-related documents, ensuring data integrity and accessibility

Ethereum

Ethereum (public blockchain) is considered for their robust smart contract capabilities, security features, and widespread adoption. Ethereum enables public, decentralized verification, uses Proof of Stake (PoS) for consensus mechanism

Node.js

Used to build a robust, scalable backend server to handle API requests, manage business logic, and facilitate blockchain interactions

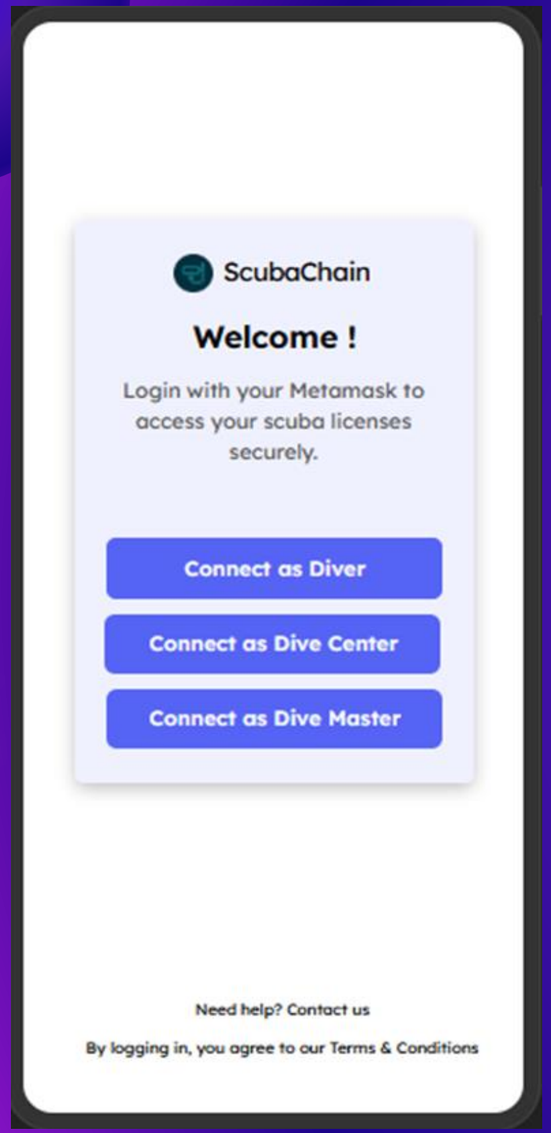
PostgreSQL

A relational database system used for storing off-chain data, such as user profiles and certification metadata. Offers strong consistency, scalability, and integration capabilities with blockchain-based applications.

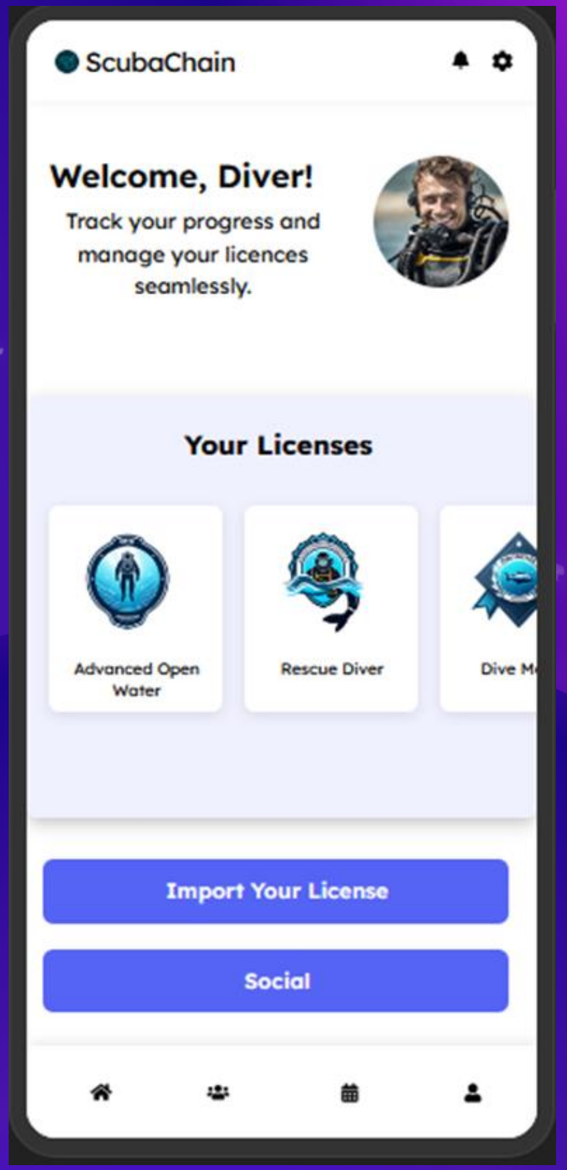
Smart Contracts

Written in Solidity (for Ethereum), smart contracts automate certification issuance, verification, and updates. Ensures immutable and tamper-proof record keeping.

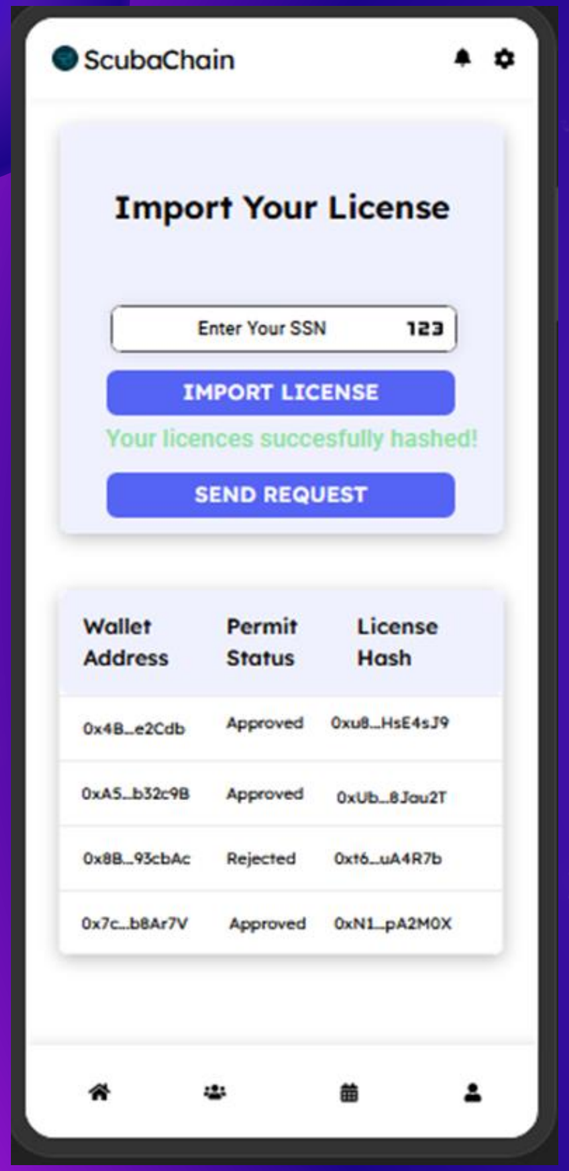
User Interface



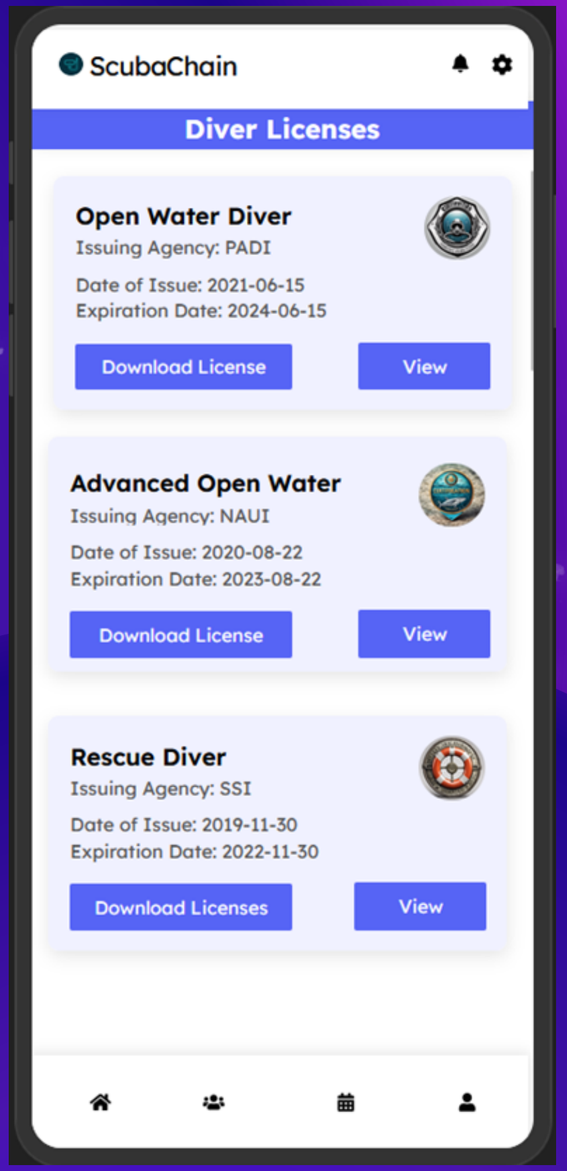
- User needs to register by using their Metamask Wallet.
- User can see their own licenses add their licenses and their own user informations such as their profile picture etc.
- Also they can check the app notifications form that page.



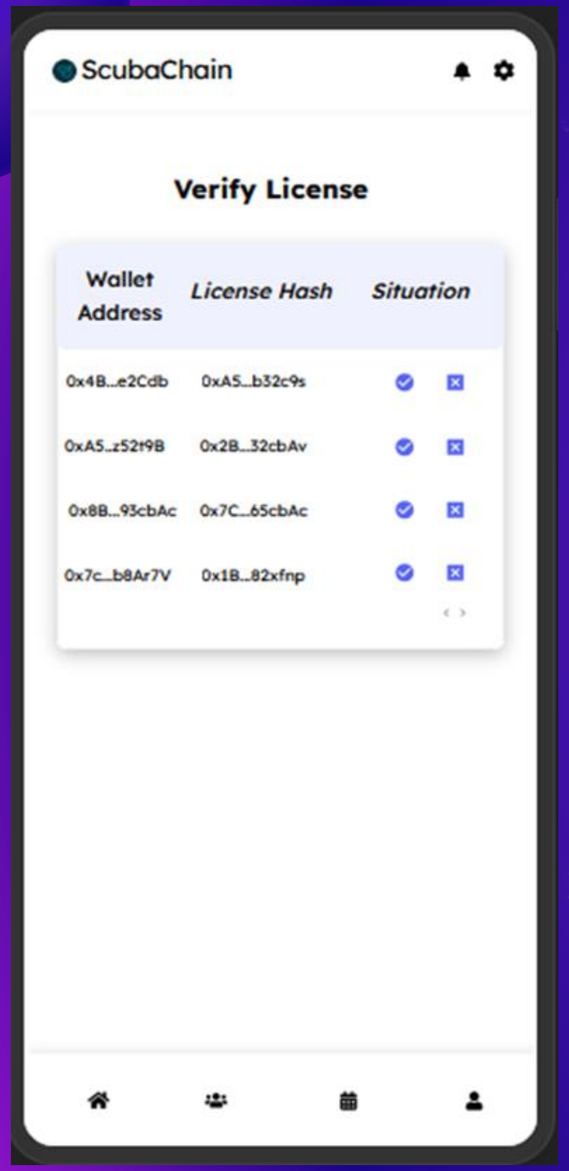
User Interface



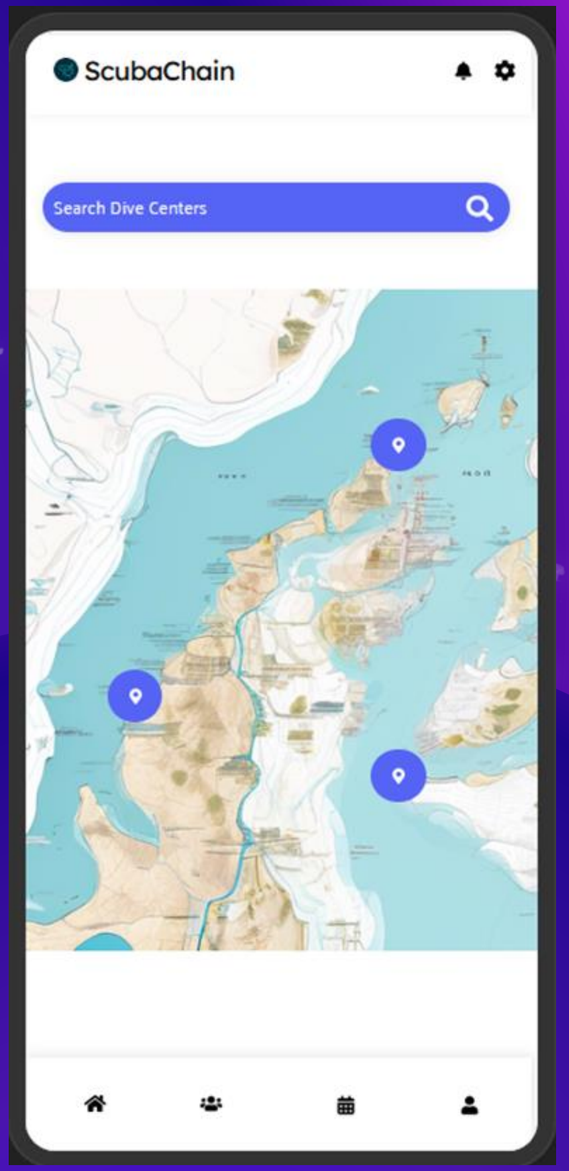
- To import license to application user need to input their SSN number.
- After importing the licenses user can see all of the licenses they have in the application and can download the licenses into their phone if they want to.



User Interface



- The app provides a separate page to authorized accounts (Dive Master etc.) for verification
- When the dive center verify the diver's license. Diver can dive at verified dive centers.



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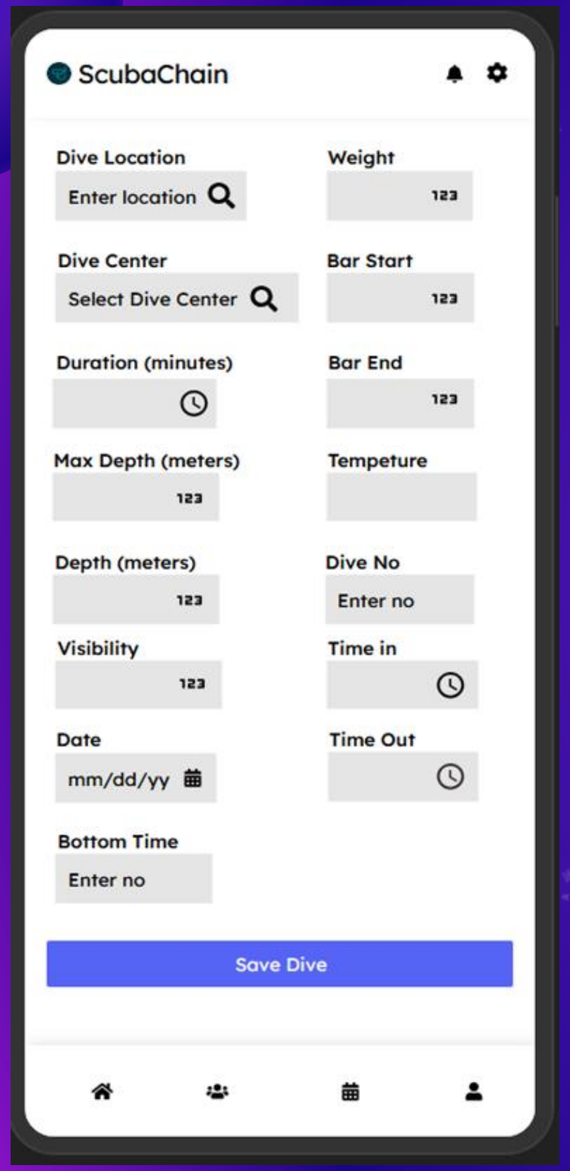
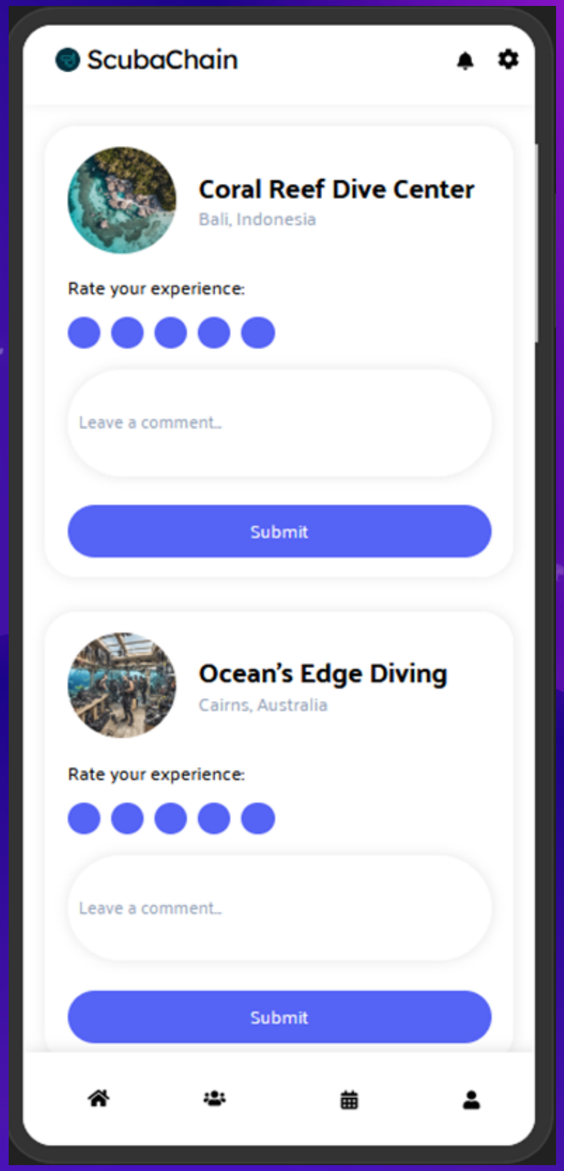
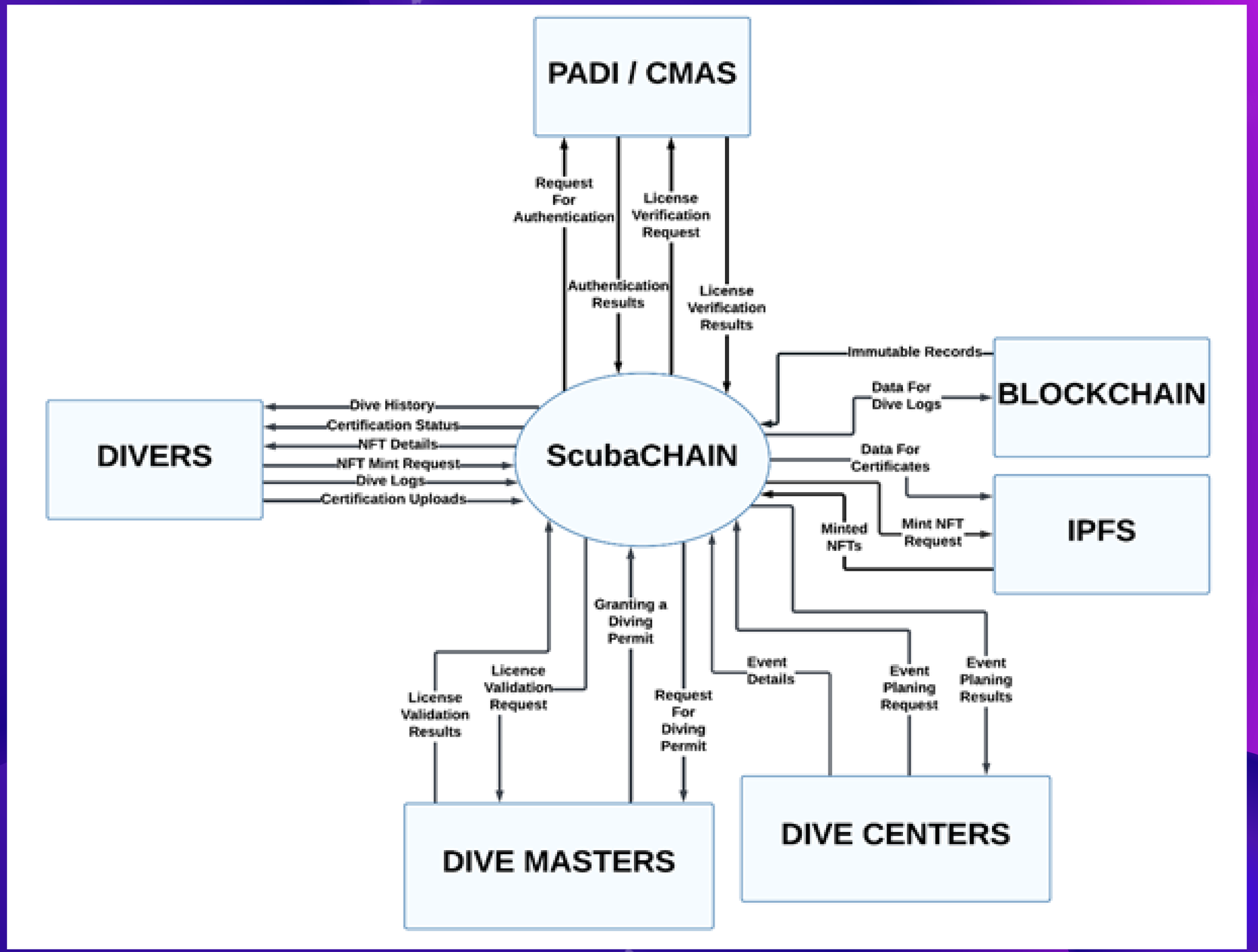


- Users can enter and save the logs of their dives into the system.
- Users can view registered diving centers and write their experiences and comments.



Level 0 Context Diagram



VISION

To revolutionize the scuba diving industry with innovative digital solutions.

To establish a global platform that ensures security, transparency, and accessibility.

To enhance the integrity and reliability of dive certifications and logging.

MISSION

To modernize scuba diving by replacing outdated paper-based systems with blockchain technology.

To provide advanced features such as real-time dive area information and service location maps.

To promote a sustainable and eco-friendly diving ecosystem

Conclusion

•ScubaChain leverages blockchain to solve key challenges in the diving industry, offering secure certifications, streamlined record management, and enhanced trust. Features like geolocation and weather integration improve user experience, driving digital transformation and paving the way for innovation in the sector.

Thanks for Listening