Decentralized Animal Health & Behavior Tracking (PoC)

Project Name: Solana ARK Foundation
Date: [11/05/2024]
User Story ID: SAF-001

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1. User Personas

Persona 1: Dr. Emily Turner

- **Name**: Dr. Emily Turner
- **Role**: Veterinary Cabinet Representative
- **Goal**: Securely access, add, and update animal medical records within the decentralized network while ensuring client data privacy through DAO approval and off-chain data storage.

Persona 2: Mark Johnson

- **Name**: Mark Johnson
- **Role**: Pet Owner
- **Goal**: Access and manage my pet's verified health and behavior records, shareable with new veterinarians or insurance providers, knowing that personal data is securely stored and accessible only by trusted parties.

Persona 3: Valencia City Validator Group

- **City ID**: Valencia City Validators
- **Role**: DAO Validator Group
- **Goal**: Vote on veterinary cabinet approvals to maintain network security, transparency, and trustworthiness in Valencia City, while earning rewards for each successful validation. Validator identities remain private, with votes recorded by wallet address only.

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2. User Stories

User Story for Dr. Emily Turner (Veterinary Cabinet Representative)

As a verified veterinary cabinet representative, **I want to** add and update animal medical records on the blockchain, with encryption keys for accessing sensitive off-chain data, **so that** I can contribute to a transparent and decentralized system while ensuring client privacy.

- **Functionality**: The platform enables veterinary cabinets to apply for access via the DAO. Once approved by the DAO, their wallet address is added to an allowed list, granting them an encryption key to securely access and update data.
- **NFT Attributes**: Each medical record update mints an NFT with non-sensitive metadata (e.g., treatment date, type, and veterinary wallet ID), while sensitive information (such as doctor's name and license ID) remains off-chain.
- **User Interaction**: Veterinary cabinets access the system by logging in with their approved wallet. They can view, add, or update animal records and generate NFTs for each update. The on-chain records link to encrypted off-chain data for sensitive details.
- **Security**: Only wallets on the DAO-approved allowed list can access the encryption key, ensuring that only authorized cabinets view or modify sensitive records.

Acceptance Criteria for Dr. Emily Turner:

- Dr. Emily can apply for network access through the DAO, and upon approval, her wallet is added to the allowed list.
- Her approved wallet grants her an encryption key to securely view or update animal records.
- Medical record NFTs display only non-sensitive metadata, while sensitive details remain securely off-chain.
- Dr. Emily can securely mint and update NFTs for each medical record, accessible by all authorized users.

User Story for Mark Johnson (Pet Owner)

As a pet owner, **I want to** securely access my pet's medical and behavioral records, with on-chain data and encrypted links to off-chain sensitive information, **so that** I can confidently share my pet's verified history with other vets or insurers.

- **Functionality**: Pet owners access a dashboard with on-chain medical records and behavior data, including treatment dates and types, with vet wallet IDs. Sensitive personal data (e.g., pet owner name, ID) is stored off-chain with secure access.

- **NFT Attributes**: NFTs are created for each medical record update, storing metadata like treatment type, date, and veterinary wallet ID. The NFT metadata is visible on-chain, while encrypted links connect to off-chain sensitive data.
- **User Interaction**: Pet owners log in and view their pet's medical timeline. They can generate a unique shareable link for insurance providers or other veterinary clinics, without exposing sensitive data.
- **Security**: Only DAO-approved veterinary cabinets and the pet owner's wallet can access decryption keys, ensuring that sensitive data remains protected and private.

Acceptance Criteria for Mark Johnson:

- Mark can log in and view his pet's on-chain medical and behavioral data in a timeline format.
- Medical record NFTs show treatment type and date on-chain, with links to encrypted off-chain data.
- Personal details (such as Mark's name and ID) are stored off-chain and accessible only to him and verified cabinets.
- Mark can share a temporary access link with trusted providers for limited access to his pet's data.

User Story for Valencia City Validator Group (DAO Validators)

As a group of DAO validators for Valencia City, **we want to** assess and vote on veterinary cabinet applications for the city, **so that** only trusted veterinary cabinets join the decentralized network and contribute to a secure, transparent environment. Each validator's identity is private, with only wallet addresses and votes visible.

- **Functionality**: The Valencia City validator group operates within the DAO framework, casting votes on new veterinary cabinet applications for Valencia. Wallet addresses, rather than names, represent each validator, keeping identities private.
- **Voting Process**: Validators from Valencia City receive proposals for new veterinary cabinet applications. Each wallet casts a vote, and the majority decision among the city's validator group determines the outcome.
- **Rewards**: Validators earn rewards in SOL for each successful cabinet validation that reaches a consensus, incentivizing their participation and enhancing the network's security and trustworthiness.

Acceptance Criteria for Valencia City Validator Group:

- Each validator in the Valencia City group can view and vote on veterinary cabinet applications specific to their city.
- Voting outcomes display only wallet addresses with votes (approve or reject), ensuring validator privacy.
- Successful majority votes result in adding the veterinary cabinet's wallet to the allowed list.
- Validators receive SOL rewards per successful validation, based on individual participation within the group.

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3. Priority

- **High Priority**: These user stories are essential to building the core functionalities of the Solana ARK Foundation, ensuring secure data management, privacy, and decentralized governance.

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4. Technical Notes (for Developers)

- **Dependencies**:
    - DAO voting contract for city-based validator groups, allowing only local validators to review applications.
    - Allowed list smart contract for managing wallet addresses and encryption keys.
    - Off-chain storage integration (e.g., IPFS or Arweave) for sensitive information linked to on-chain records.
    - Interconnected DAO system to support future expansion across other cities and countries.
- **Considerations**:
    - Implement a majority voting threshold for validator groups within each city, ensuring only wallets approved by the DAO can participate.
    - Privacy-first design where validator identities are represented only by wallet addresses, while votes remain publicly visible.
    - Decentralized storage for off-chain data, linked via hashes on-chain, ensuring data integrity and secure access.

- **Security**:
    - Access control for each update or data retrieval request, checking the allowed list for wallet authorization.
    - Encryption keys issued to authorized wallets for accessing and decrypting sensitive off-chain data.
