"Marketplace Technical Foundation - TokenRent"

Technical Documentation

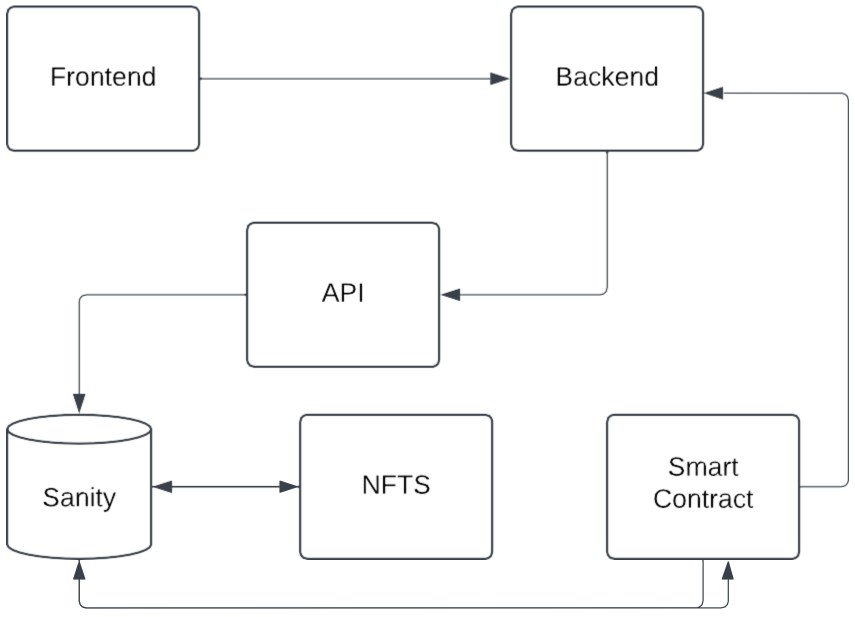
This document outlines the technical foundation for the Web3 Rental Marketplace **"TokenRent"**, focusing on system architecture, workflows, API endpoints, and project milestones. The aim is to provide a comprehensive blueprint for implementation.

System Overview

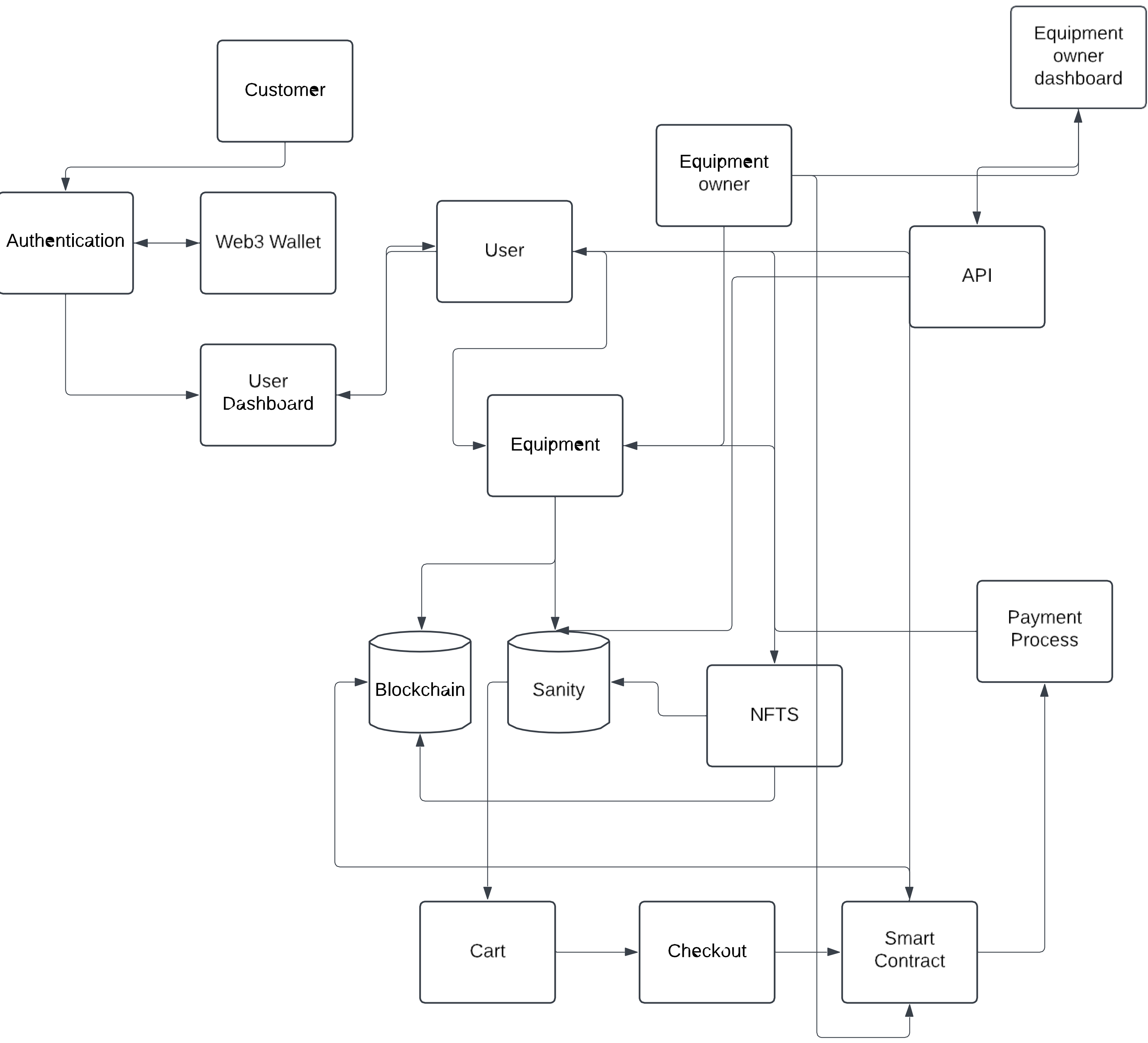
TokenRent integrates **blockchain technology**, **Sanity CMS**, and **third-party APIs** with a responsive frontend to deliver secure, transparent, and efficient rental services. Key components include:

- **Frontend**: Built with Next.js for dynamic user interaction. I will also Try to integrate 3D.
- **Blockchain**: Manages NFTs and smart contracts for rental agreements and escrow for security deposts.
- **Backend**: Powered by Sanity CMS to handle metadata and content management.
- **Third-Party APIs**: For payment processing, shipment tracking, and geolocation.

System Architecture



Detail Work Flow Diagram



Core Features and Workflows

1. User Authentication

- Users log in with Web3 wallets like **MetaMask** etc to access the platform securely.
- Wallet addresses are linked to user profiles stored in Sanity CMS.

2. Product Management

- Product data (name, description, price, NFT ID) is fetched from Sanity CMS.
- NFTs are linked to products to ensure ownership transparency.

3. Rental Transactions

- Smart contracts handle rental agreements, holding security deposits in escrow.
- Rental status updates are reflected on the blockchain and frontend.

4. Payment and Shipment Integration

- Payments are processed via a crypto gateway, updating the rental smart contract.
- Shipment tracking APIs provide real-time delivery updates for physical products.

API Endpoints

1. Key API Categories

We will need APIs for the following purposes:

1. **Product Management:** Handle product data like details, pricing, and availability.
2. **User Management:** Manage user profiles and authentication via Web3 wallets.
3. **Rental Transactions:** Process rental agreements, payments, and security deposits.
4. **NFT Integration:** Fetch data about product ownership and rental status from the blockchain.
5. **Shipment and Location Services:** Track deliveries and provide location-based services.

User Authentication

- **Endpoint**: /users
- **Method**: POST

- **Description**: Authenticate users via Web3 wallets.
- **Request Example**:
- {
-   "walletAddress": "0x123abc",
-   "name": "John Doe",
-   "email": "john.doe@example.com"
- }
- **Response Example**:
- {
-   "userId": 1,
-   "status": "success",
-   "message": "User authenticated successfully."
- }

Product Management

- **Endpoint**: /products
- **Method**: GET
- **Description**: Fetch a list of available products.
- **Response Example**:
- [
-   {
-     "id": 1,
-     "name": "4K Drone",
-     "price": 50,
-     "availability": "Available",
-     “image”: camera.png,
-     "NFT_ID": "0xabc123"
-   }
-]

Rental Management

- **Endpoint**: /rentals
- **Method**: POST
- **Description**: Create a new rental agreement/transaction.
- **Request Example**:
- {
-   "productId": 1,
-   "userId": 2,
-   "rentalDuration": "3 days",
-   "securityDeposite": 100,
-   “paymentAmount”: 40,
- }
- **Response Example**:
- {
-   "transactionId": 789,
-   "status": "success",
-   "message": "Rental created successfully."
- }

NFT Metadata

- **Endpoint**: /nfts/:id
- **Method**: GET
- **Description**: Fetch details of a specific rental transaction, including blockchain status.
- **Response Example**:
- {
-   "NFT_ID": "0xabc123",
-   "productId": 1,
-   "owner": "0xuser456",
-   "rentalStatus": "In Use",
-   "rentalHistory": [

- {
-   "transactionId": 789,
-   "rentedBy": "0xuser789",
-   "duration": "3 days"
- }
-]
- }

Shipment and Location Services

- **Endpoint**: /shipment
  - **Method**: POST
  - **Description**: Create a shipment order for a physical product.
  - **Request Example**

```
{
  "orderId": 789,
  "address": "123 Main St, City, Country",
  "expectedDeliveryDate": "2025-01-18"
}
```

Response Example:

```
{
  "shipmentId": "SHIP123",
  "status": "Created",
  "trackingLink": "https://shipment.example.com/track/SHIP123"
}
```

Endpoint: /geolocation

- **Method**: GET
- **Description**: Retrieve nearby available products based on user location.
- **Request Example**:

```
{
  "latitude": 40.7128,
  "longitude": -74.0060
}
```

Response Example:

```
[
  {
    "productId": 1,
    "name": "4K Drone",
    "distance": "2.5 miles"
  },
  {
    "productId": 3,
    "name": "Event Projector",
    "distance": "5 miles"
  }
]
```

Milestones

Milestone 1: Business Planning Day

- Define business goals, target audience, and core workflows.
- What we Develop.
- **Duration**: 1 Day

Milestone 2: Technical Day Thinking

- Define how the business work, there features, components ,api and how they interact with each other.
- How Smart Contract handle the rental agreement.
- How NFTS saved the digital proof of ownership of the product.
- How Sanity stores the product metadata with NFTS integration.

- How api’s look like (I created the Examples)
- **Duration**: 1 Day

Milestone 3: Backend Development

- Implement Sanity CMS for content management.
- Develop NFT and rental agreement smart contracts using the solidity language.
- Test the smart contracts.
- Deployments of Smart Contracts So it will use in frontend.
- **Duration**: 2 or 3 Days

Milestone 4: Frontend Development

- Build a responsive UI using Next.js with the integration of 3D. Also this UI is New.
- Integrate APIs and blockchain interactions.
- **Duration**: 2 or 3 Days

Milestone 5: Testing and Debugging

- Conduct end-to-end testing to ensure functionality.
- Resolve bugs and optimize performance.
- **Duration**: 1 Days

Milestone 6: Deployment

- Deploy the Frontend nextjs in Vercel.
- Perform final checks and launch.
- **Duration**: 1 Days